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Dedicated to the Indomitable Spirit & Sacrifices of the SOF Medic

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COVER

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Marines and Army Special Forces maintain a security perimeter as a UH-60 Black Hawk helicopter lifts off for a medical evacuation south of Camp Blessing, Afghanistan, June 2004.

DoD photo by Lance Cpl Justin M. Mason, U.S. Marine Corps. (Released)



From the Editor

The Journal of Special Operations Medicine (JSOM) is an authorized official military quarterly publication of the United States Special Operations Command (USSOCOM), MacDill Air Force Base, Florida. The JSOM is not a publication of the civilian Special Operations Medical Association (SOMA). Our mission is to promote the professional development of Special Operations medical personnel by providing a forum for the examination of the latest advancements in medicine.

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Official Distribution: This publication is targeted to SOF medical personnel. There are several ways for you to obtain the Journal of Special Operations Medicine (JSOM). 1) USSOCOM-SG distributes the JSOM to all our SOF units and our active editorial consultants. 2) SOMA members receive the JSOM as part of membership. Please note, if you are a SOMA member and are not receiving the subscription, you can contact SOMA through www.somaonline.org or contact MSG Russell Justice at justicer@soc.mil. SOMA provides a very valuable means of obtaining SOF related CME, as well as an annual gathering of SOF medical folks to share current issues. 3) For JSOM readers who do not fall into either of the above mentioned categories, the JSOM is available through paid subscription from the Superintendent of Documents, U.S. Government Printing Office (GPO), for only \$30 a year. Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. GPO order desk-telephone (202) 512-1800; fax (202) 512-2250; or visit <http://bookstore.gpo.gov/subscriptions/alphabet.html>. You may also use this link to send a email message to the GPO Order Desk—orders@gpo.gov. 4) The JSOM is online through the Joint Special Operations University to all DoD employees at <http://www.hurlburt.af.mil/jsou>. On the left you will have several tabs; you must first “log-in” using your SS#, DOB, and name; then go to “publications.” Scroll down until you get to the JSOM and click on the picture. From this site, you can link straight to the Government Printing Office to subscribe to the JSOM. We are working with the JSOU to have a SOCOM-SG medical site; we will keep you posted as that progresses. 5) The JSOM can also be emailed in PDF format; if you would like to be added to the PDF list please send your request to jsom@socom.mil.

Don’t forget to do your CMEs!!!! Please let us know how you like the crossword puzzles. Remember, our continuing education is for all SF medics, PJs, and SEAL corpsmen. In coordination with the Uniformed Services University of Health Sciences (USUHS), we offer CME/CNE to physicians, PAs, and nurses.

The JSOM remains the tool that spans all the SOF services and shares medical information and experiences unique to this community. The JSOM continues to survive because of the generous and time-consuming contributions sent in by physicians and SOF medics, both current and retired, as well as researchers. We need your help! Get published in a peer-review journal NOW! See General Rules of Submission in the back of this journal. We are always looking for SOF-related articles from current and/or former SOF medical veterans. We need you to submit articles that deal with trauma, orthopedic injuries, infectious disease processes, and/or environment and wilderness medicine. More than anything, we need you to write CME articles. Help keep each other current in your re-licensure requirements. Don’t forget to send photos to accompany the articles or alone to be included in the photo gallery associated with medical guys and/or training. If you have contributions great or small... send them our way. Our e-mail is: JSOM@socom.mil.

Enjoy this edition of the journal, send us your feedback, and get those article submissions in to us now!

Maj Michelle DuGuay

From the Surgeon



Frank Butler, MD
CAPT, USN
HQ USSOCOM Command Surgeon

To all those involved with planning and running the recent Special Operations Medical Association conference: GREAT JOB! This meeting was widely acclaimed by the attendees as the best SOMA we've ever had. Congratulations to SOMA president COL Al Moloff, Dr. Dale Hamilton, LTC Bob Harrington, MSG Sammy Rodriguez, Mr. Dave Davis, SGM Russ Justice, and everyone else who lent their time and expertise to putting this event together. The new location at the Marriott was a great choice and gave us a superb place to highlight the many excellent speakers and displays that the program committee provided. Thanks to General Brown, U.S. Surgeon General VADM Rich Carmona, and Navy Surgeon General VADM Don Arthur for making the time to be with us. Thanks also to CAPT Andy Woods and COL Rocky Farr for allowing me to spend Saturday sitting in on the WARCOM and USASOC component surgeon conferences. Despite the high OPTEMPO and ongoing demands of the Global War on Terrorism on SOF combat medics and those who support them, there was a great deal of positive energy in the meeting rooms. The sense of teamwork, the professionalism, and the mission focus displayed by the groups in these conferences was truly inspiring to behold.

The Operator Forum chaired by SGM Harold Hill and MSG Ted Westmoreland was the highlight of the meeting, as it was last year. Featuring this session in the main conference hall greatly enhanced the impact of the presentations. The chance to hear frontline SOF medics telling their stories and describing both their successes and the difficulties they encountered in caring for their wounded teammates was alone worth the time and expense of attending the conference. Another great presentation this year was the Round Table Discussion on "Current Issues in SOF Medicine" chaired by COL Butch Anderson from the Special Forces schoolhouse in Ft. Bragg. He had four outstanding SOF physicians (LTC Jim Czarnik, Major Rick Ong, Major Rob Kapowicz, and LT Rob Leuken) each provide their views on a selection of current controversies in SOF medicine. This session really got the crowd involved and was a great way to ensure that both sides of these timely issues were well represented. This is another superb forum that we need to keep going at future SOMAs.

2005 USSOCOM Command Surgeon's Award

The USSOCOM Surgeon's Award was started in 2004 as a way to recognize individuals external to Special Operations who have made outstanding contributions to SOF medicine. The winner of this year's USSOCOM Command Surgeon's Award is Dr. Norman McSwain. Dr. McSwain is one of the best-known trauma surgeons in the United States and has been a long-standing member of the American College of Surgeons Committee on Trauma. He has been the Director of the Trauma Service at Charity Hospital for 27 years and has been one of the pioneers of Prehospital Medicine in the United States. He was the founder of the concept of Prehospital Trauma Life Support in 1982. His efforts in the civilian sector have resulted in life-saving trauma care being advanced out of the hospital into the streets and ambulances, resulting in better-trained Emergency Medical Technicians and thousands of lives saved. He is still the Medical Director of PHTLS and the Editor of the PHTLS Manual.

Eight years ago, Dr. McSwain approached Rear Admiral Mike Cowan and COL Steve Yevich at the Defense Medical Readiness Training Institute with a proposal that the military be better represented in the PHTLS movement and have its own chapter in the PHTLS Manual. They agreed and took some of the emerging concepts going on in SOF medicine at the time and made them part of the new military medicine chapter that was published in the Fourth Edition of the PHTLS Manual in 1998. This initiative on Dr. McSwain's part established a strong working relationship between SOF medicine and PHTLS that has continued to flourish under his leadership. This relationship gives us a direct link between the SOF combat medic and the ACS Committee on Trauma. As the BUMED Committee on Tactical Combat Casualty Care continues to upgrade the training and equipment recommendations provided to both combat medics and non-medical combatants, the PHTLS link helps to provide both a process for review and a mechanism to publish these updates. The new revisions of the TCCC guidelines that will soon be published in the upcoming Sixth Edition of the PHTLS Manual are the result of a tremendous cooperative effort between SOF and conventional forces, between physicians and combat medics, and between civilians and military personnel from all of the uniformed services.

The work that Dr. McSwain has pioneered and furthered over the years has helped save hundreds of lives on the battlefield to date and will undoubtedly save many more lives in battles to come. It is an honor to have him receive the 2005 USSOCOM Command Surgeon's Award.

Dr. McSwain, by the way, was one of the true heroes of Hurricane Katrina in New Orleans. The day after the storm hit, the levees broke and the city flooded. While others headed for the high ground, Dr. McSwain headed for Tulane Hospital to make sure that his patients were safe. He stayed there at the hospital for the next six days, helping to keep them alive during the blackout and then helping to evacuate them to safety. Dr. McSwain did not stand down until all of Tulane's patients had been evacuated, superbly personifying the SOF tradition of leaving no one behind.

COL John Holcomb and SFC Dom Greydanus at the ISR were the recipients of the 2004 award for their outstanding work with the TCCC Transition Initiative.

Next USSOCOM Command Surgeon

A few months back, I got a letter from the Naval Personnel Command thanking me for my service to the country during my Navy career and informing me that as of 1 July 2006, that career would be over. It's a pleasure to announce that General Brown has selected COL Warner "Rocky" Farr to be the next Command Surgeon at USSOCOM. COL Farr began his career as a Special Forces 18D medic in 1967. He is one of the last few people on active duty to have served in MACV SOG. If this name is unfamiliar to you, I recommend that you get a book called "SOG" by Major John Plaster and have a look at it. This group accomplished some amazing things, despite extremely high casualty rates, during the Vietnam War. Rocky rose all the way to E-8 on the enlisted side, then decided to go to medical school. He has since become a pathologist, a Flight Surgeon, a Diving Medical officer, and a military medical historian. Rocky has become one of the leading figures in Special Operations medicine during his outstanding tenure as the Command Surgeon for the U.S. Army Special Operations Command and there is no doubt that he will continue to do great things at USSOCOM.

The chance to be at SOMA and see so many old friends and colleagues reminded me once more that working with the best warriors and warrior medics in the world is an honor and privilege that never fades. Thanks to everyone in Special Operations medicine for another year of incredible achievements. Stay strong, stay safe, and keep up your great work.



SENIOR ENLISTED MEDICAL ADVISOR (SEMA)
HMCM GARY WELT



Well, what a year it has been. We have now been involved in sustained combat operations for over four years and our SOF medical forces have been there from the very start doing what we do best -- saving lives on the battlefield and taking care of all of the combat forces involved with OIF, OEF, OEF-P including several dozen other countries around the world. Keep up the great work, and thanks for what you do!

SOMA CHALLENGE

No, not I'm not referring to the kind of SOMA Challenge we had back in 2002 and 2003. So, why is this titled the "SOMA Challenge?" Because it's always a challenge to get guys to attend! With operational tempo the way it is, and all of the requirements to maintain soldiering skills, most importantly the short time opportunity to spend time with the families, I understand it's difficult to justify another four or five days away from home. But you do get something out of this one. We have just completed another outstanding meeting of the SOMA (Special Operations Medical Association) and it was another resounding success. The ability for all of SOF medicine to come together and share thoughts, practices, and new achievements in the field of Special Operations medicine was better this year and was more open-minded than those in all years past. I witnessed professional conversations between enlisted medics, physicians, physician assistants, and nurses in every venue possible. The "Operators Forum" presentation by the enlisted medics this year, as last, were battlefield current, deep in application, and heavy on lessons learned. Several of the medical professionals in attendance were awestruck by the knowledge base and presentations provided by the enlisted medics. The accomplishments of the medics in combat and in garrison were lauded by all who were in attendance. I invite all of you who could not be there to try real hard next year to not only show up, but prepare to share your experiences with SOF medicine and be a presenter in December '06!

On the Horizon

What's in store for Special Operation medicine this year? In my opinion, that's up to you - the enlisted SOF medical operator. I am extremely fortunate to be at the helm of what I consider to be the premiere group of tactical combat medical providers in the entire world. But without your input, candor, and perseverance, we stagnate.

I have talked to several dozen medics out there in the force who seem to believe that we, SOCOM, have missed the boat by creating the SOF Advanced Tactical Practitioner (ATP) standard of certification. Some of you wish to become or return to the civilian standard of National Registry EMT- Paramedic (EMT-P). The rhetorical concerns of "no one recognizes the SOF ATP card;" "we can't work or recertify in the civilian hospitals;" and "we can't practice as an EMT-P when we get out," are all valid complaints very similar to the reverse complaints we as medics expressed when we were bound by the NREMT EMT-P standards and are the personal concerns we are addressing. However, they truly have no real impact on whether or not we can fulfill the USSOCOM Commander's stated mission in the Global War on Terror. The step away from the NREMT-P was fully staffed with all SOF components and received their concurrence. In my opinion, to take that leap backwards to a lesser scope of practice and certification standard such as NREMT-P would be a detriment to the entire force. Let me explain; there is a wide and varied scope of practice out there for all of the different flavors of "Medics" under the SOCOM umbrella. We have the SF 18D, the AF IDMT, and the Navy SOIDC, all of whom have a more advanced "Scope of Practice" as directed and outlined by their component surgeon. ATP was not designed nor intended for the advanced care providers mentioned above by limiting their scope of practice, merely to align all SOF enlisted medical providers with a common core of skills and practical certification. That being stated, the baseline of the SOF interoperable standard as dictated by the Commander, USSOCOM is the SOCM-ATP. Therefore, the SOF medic who has completed the baseline SOCM course of instruction and ATP certification is allowed to work under the license of his medical supervisor and practice para-medicine in the austere environment to a level that **is not** appreciated by the EMT-P. To my knowledge, very few, if any, paramedics are allowed to exercise the SOF Tactical Medical Emergency Protocols (TMEPs), nor are they

allowed to drop a chest tube, not to mention that ability to conduct sick call screening. Oh yea, I don't think they can suture their buddies or remove an ingrown toenail, even under supervision! My point is that you are **much more than just a paramedic!** Paramedics are the current national standard, on-the-street pre-hospital care providers in the United States. Each state and territory has their own standard of care or scope of practice for EMTs and paramedics. Contrary to popular belief, not every state recognizes NREMT as the only certifying agency. Many states have established their own certification standards and most are eligible to sit for the NREMT-P exam. So, upon completion of the SOCM course, all graduates are eligible to sit for the National Registry exam. This is your route to NREMT-P certification should you so desire. The costs and fees associated with this are NOT intended to be funded by MFP-11 medical training dollars and are the responsibility of the individual as USSOCOM provides an ATP certification that satisfies the requirements of the USSOCOM mission. Remember, no other military medical professional, i.e., doctor, nurse, PA, has their licensing fees paid for by the military. Be advised that once certified as a NREMT-P, you will still be required to maintain your ATP certification, which is good for up to twentyseven months, based on which part of the quarter you completed SOCMSS-C. The National Registry recertification cycle is biannual as well, but only provides for recertification on 31 March of the calendar year your NREMT-P expires. This was one of the main problems we had in the past. The choice is yours, go back NREMT-P or help USSOCOM establish nationwide recognition for the current ATP program that provides what we need.

The bottom line is that the SOCM-ATP certification is a safety mechanism that protects the medics and physician supervisors as they are provided with a scope of practice that far exceeds the NREMT-P. There is nothing that prevents or precludes a medic's physician supervisor from limiting or expanding his scope of practice as required for the tactical situation. Each medic I spoke with stated that they wanted something to show for their hard work in school. I agree, NREMT-P is better than nothing, but I would rather see you get the education credit for the six months of intense training and education you completed as a SOCM student.

As your Senior Enlisted Medical Advisor, it is my job to present to the SOCOM Surgeon and the Commanding General the ground truth from the force. Let your component SEMAs know your stand on this very important matter. You have my permission to contact me directly via e-mail with your concerns.

On a Light/Heavier Note

It never ceases to amaze me the personal and professional pride each and every one of you take to maintain the force in great working health. This task is never taken for granted and always completed with the care each of you would give your own mother. Let me take this opportunity to remind you what you should already know, but may not realize; your performance is superb and your undying devotion to your difficult and unique job is beyond worthy of award recognition. Each and every medic that I saw while overseas, SF 18D, SOIDC, R-MED, PJ, and even the conventional medics and corpsmen, had the same look in his eyes. They were tired, battle-hardened, rode hard, and put away wet more times than not, but, their indomitable spirit and compassion for the common Soldier's well-being NEVER faltered. They asked me what was in the future for medical advancements on the battlefield, where could they go next to enhance their medical career, and how could they get into Special Operations? Not a one asked about awards or recognition or what's in it for them. I noticed that all it takes is for someone to listen to them and they began telling stories of unbelievable bravery while going about their seemingly mundane and routine jobs.

Don't be confused -- these men are warriors; they are not bragging on themselves but rather sharing some difficult moments with me that they know I will understand. If I could, I would give each one of them a medal just for doing their job. It is an unwritten rule that the medic, corpsman, or PJ doesn't rate battlefield recognition just for doing his job! If you were to ask most combat experienced General and Flag officers who are wearing a purple heart how they feel about the man who saved their life, most would agree it was the medic to whom they owe their life, longevity, and for some, their current positions. For without the medic's presence on the field of battle, they would definitely not be where they are today. It's not about recognition or medals, it's about their fellow man! It's all about the man next to you, that's all!

Men, from the bottom of my aid bag and my heart, I personally thank you for what you do every day. Keep up the great work and let me know how I can help you and our teammates!

Hoo-Yah!!

Gary "Doc" Welt weltg@socom.mil

Meet Your JSOM Staff

EXECUTIVE EDITOR

Frank K Butler, MD

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CAPT Frank Butler graduated from Basic Underwater Demolition/SEAL training in 1972 as a member of Class 64 and subsequently served as a platoon commander in both Underwater Demolition Team Twelve and SEAL Team One. After attending medical school at the Medical College of Georgia, he did his internship in Family Practice at Naval Hospital Jacksonville. CAPT Butler spent five years as a Diving Medical Research officer at the Navy Experimental Diving Unit in Panama City, where he helped to develop many of the diving techniques and procedures used by the Navy SEAL teams today. He then did a residency in Ophthalmology at the National Naval Medical Center in Bethesda, where he was Chief Resident in 1989. CAPT Butler was then assigned to the Naval Hospital Pensacola where he was Chief of Ophthalmology from 1989 to 1994. He assumed the duties of Director of Biomedical Research for the Naval Special Warfare Command in 1989 as well. He was transferred to his current position as Command Surgeon, U.S. Special Operations Command, in March 2004.

MANAGING & PRODUCTION EDITOR

Michelle D. DuGuay, RN



Maj DuGuay joined the Army Reserve in 1987 and served as a nurse in a Combat Support Hospital unit for three years before switching services in 1990 to become an Air Force C-130 Flight Nurse. She is currently an IMA reservist attached to the SOCOM/SG office where she is in charge of management, production and publication of the JSOM. Maj DuGuay has a Bachelors in Nursing and a Masters in Business Administration/Management. Her 20 year nursing career includes being a flight nurse in both the military and private sector, 15 years of clinical experience in emergency and critical care nursing as well as being an EMT and a legal nurse consultant. She also served as the military liaison to her Disaster Medical Assistance Team (DMAT.) Prior to the SG office, Maj DuGuay's experience at USSOCOM includes an assignment in the Center for Force Structure, Resources, Requirements, and Strategic Assessments.

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USASOC



Rocky Farr, MD
COL, USA
Command Surgeon



I am starting to write this edition of my *Journal of Special Operations Medicine's* (JSOM) component surgeon column at the Special Operations Medical Association (SOMA) conference here in Tampa, Florida just after the weekend USASOC Surgeon's Conference. A large thank you to SOMA for the use of the dedicated room and all the other facilities for the weekend component surgeon conference. SOMA is/was the best I have ever seen (think I went to my first SOMA at Fort Bragg in 1987), as was the USASOC Surgeon's conference. Do not take my word for it -- ask those who attended. LTC Bob Harrington, the 19th Special Forces Group (Airborne)'s Group Dentist, was the program chairman and he got SOMA right! The focus this year was on "Lessons from the Front," with the objectives to review and critically analyze medical issues in Operation Enduring Freedom and Operation Iraqi Freedom. In addition, I thought the foreign services participation was good. It was great to see the special operations medical capabilities of other services and other countries described and compared. Since this instruction conformed to the national curricula and meets the National Registry of EMT continuing medical education requirements and medical officer CME requirements, it is cheap, timely, pertinent, and effective continuing education that all should try to attend.

Colonel Al Moloff, SOMA President, ably assisted by LTC Dale Hamilton, have made great improvements in the proceedings with the new location and arrangements. Thanks, Al; SOMA was a great mix of operators, physicians, and others all nicely meshed. The lessons learned panels were awe-inspiring. A special feature of this year's SOMA was the James A. Haley VA Medical Center's Annual Blast Injury Conference. It attracted some 200 additional attendees and some 40 physicians. This is an area of definite interest to us in the current war and featured Dr. Michael Stein, Director of Trauma for the Rabin Medical Center in Israel. Dr. Stein is considered the leading world authority on trauma secondary to blast.

My office was on the mark on issue briefings and the unit operational brief backs on Saturday of the weekend Army conference were truly spellbinding. Thanks to all in my office, MSG Matcham in particular, the unit officers, and the Soldiers who contributed. MAJ Muller and Mrs. Sharon Pope did the audiovisuals and administrative running of the weekend, which went smoothly (so Josh lives).

Next year's SOMA needs to build on all this. Soldiers who presented at this year's SOMA need to commit to paper their already presented talks and submit them to the journal for publication. Most of the hard work is done-making the presentation. Now just write it down! Various attendees as I was leaving commented that we had exactly the right balance among medic stuff, doctor stuff, other medical professional stuff, and lessons learned stuff. See you there next year.

Congratulations also to Army honorees at SOMA mess night:

1. USASOC Medic of the Year: SGT Webster Slavens, 3rd BN, 75th RGR REGT

2. The SOMA Saber for lifetime achievement/service:
COL Kevin Keenan, CDR, SWMG(A)
COL Frank Anders, HQ, USASOC

Also recognized during the USASOC Surgeon's Conference:

1. SWMG(A) JSOMTC Instructors of the Year:
SOCM Instructor of the year: SSG Michael S. Phillips
SFMS Instructor of the year: SFC Michael A. Duncanson
2. 18D medic of the year: SFC Christopher L. Livesay
3. SOCM Medic of the Year: SGT Webster Slavens, 3rd BN, 75th RGR REGT

Things are changing at Fortress Bragg in the SOF power structures. LTG Wagoner, who was the SOC-SOUTH commanding general some time ago, replaced LTG Kensinger as commanding general of USASOC.

LTG Kensinger has retired after commanding USASOC for nearly three years. BG Mulholland replaced Major General Mike Jones who has retired after commanding U.S. Army Special Forces Command. Also right before SOMA, LTG Yarborough died at age 93. He, as a brigadier general, reported to President Kennedy in 1961 in that then unauthorized Green Beret. In addition, he designed *the* para-



chute wings at the start of World War II and his name is on *THE knife*. A legend has gone on. First Colonel Aaron Bank departed and now LTG Yarborough.

It is truly great to see how we are continuing to develop tactically proficient SOF medical leaders. We have always had superb medics and noncommissioned officers but for too long the officers seemed to be just passing through. The structure of the Army Medical Department allowed them one two-year long assignment and then they were off to residency training usually never to return. Now times have changed. All our medical officers come more senior, branch qualified, and residency trained. We have great AMEDD officers with repetitive assignments in special operations that are benefiting from varied career experiences in Rangers, Special Forces, JSOC, support command, and SOF aviation -- all in one career. This did not used to happen. War is good for teaching lessons and selecting out the soldiers who get it. The many medical corps officers at SOMA who sound just like me heartens me! Sounds egotistical but since I am leaving it's important that someone else be able to take up the banner of army special operations medicine and be able to successfully engage with the leadership from a position of power, experience, and credibility.

For those of you who were not at SOMA and may not know, I am PCSing to Tampa in the summer of 2006 (probably report 1 June 2006) to be the USSOCOM Command Surgeon. CAPT Frank Butler, an old SEAL friend, is retiring. Berets off to Frank; he has made great strides in the sustainment training of our medics, espe-

cially by his involvement in the Tactical Combat Casualty Care Committee and the Institute of Surgical Research's TCCC traveling team -- all Frank's ideas. He has also been the absolute leader in directing SOF medical research for a decade. Tough fins to fill.

I will have been at Fort Bragg for seven years when I depart USASOC next summer so if I was going to have any bright shiny ideas for the good of the force I have already had them. With superb 18Ds and SOCms saving lives daily, recovery from anesthesia firmly in the Joint Special Operations Medical Training Center (thanks to Colonel Kevin Keenan and Frank Anders), the Special Warfare Medical Group (Airborne) in existence, all our medical officers board certified, a level 2 medical capability in the SB(SO)(A), and the war now going on five years, perhaps it is the right time to move on. My replacement will be Colonel Joe Carvalho, who currently commands a combat support hospital and has prior assignments (with tabs to prove it) in both Special Forces (1st BN, 1st SFG(A)) and as the 75th Ranger Regiment Surgeon.

Speaking of war, GWOT is a war that started with an unconventional/guerrilla war. As we all said when we were walking around Afghanistan in late 2001: *"Thank God we never changed Robin Sage."* My commanding general when I get to Tampa, General Brown, will, of course, set what I will work on when I get to USSOCOM. Left to my own devices, I would like to concentrate some time on going back to our historical roots and help us all in studying our history and doctrine more. Some may remember a daylong seminar that my office gave at SOMA in 2001 on UW/GW medicine. Several times in the early parts of the unconventional war in Afghanistan in 2001 and 2002, I pulled out Field Manual 31-20s and 31-21s from the 1950s and 1960s to get the required information to doctrinally prosecute this new, but at the same time old, guerrilla war. I have copies, both electronic and hard copy, of all our old field manuals, classified and unclassified. We have great UW/GW doctrine; we just do not print it anymore!

In the fall 2005 issue of the JSOM, I published a book list of my collection of SOF and military medicine books possibly worth consulting.¹ I rummage old bookstores and the internet for copies, which are usually quite reasonable in cost. This issue of the JSOM has my article on Guerrilla Warfare and Guerrilla Warfare medical history books applicable to us.² Other practitioners of the art have also begun to go back and look at SOF medical history. LTC Pete Benson, the SOCEUR surgeon, has been looking at the World War II literature on the Yugoslavia special operations experience and their use of both allied forward surgical teams and air evacuation of indigenous fighters to allied hospitals (see that section of my article in this issue of the JSOM). I have much of the Yugoslavia experience references on a CD if anyone wants one. We are all still grappling with all these same issues: Do/should indigenous force wounded enter into the American evacuation system? Should guerrillas be treated inside the "Guerrilla Warfare Operational Area (GWOA)?" (a 1950s term). Should they be evacuated out of the GWOA?

There is a wealth of literature out there from those who have fought before us -- read it, form opinions, and write articles for the journal. Feel free to email me for help, resources, and especially any new finds in the literature. I plan to write a second article on the military (field manuals, etc.) literature for the JSOM and present some of this at the 2006 SOMA. See you there!

As I prepare to leave, I would like to thank all whom I have interacted with and my office staff. I have been blessed with a continual procession of fine quality officers and NCOs who served in my office and our units and we all have been proud to serve the Soldier medics in the field in any way we could. The office is in the best shape I have seen in six years. Medical Operations, under the leadership of LTC Rockhill, ably assisted by LTCs King and Tanner, plus Majors Barnes and Muller, is more included in the headquarters planning cycle than I have ever seen. Colonel Dalton Diamond continues to excel in a very difficult role as a reservist as my shadow and confidant. Major Hank Sully continues to run the world class medical logistics shop. LTC Brown, as command veterinarian, is overseeing a growth in Veterinary Corps officers, as is LTC Littrell with preventive medicine officers. COL(Ret) Bert Kinkead has made great changes in the Intel shop. Many of the medical officers who have spent a spell in the USASOC Surgeon's office or in one of our units have moved on to Division Surgeon assignments. This premier assignment for an operationally minded Army medical corps officer shows how well they are competing and how we are slowing infiltrating Army medicine with low friends in high places. Also thanks to the many battalion, squadron, group, regimental, and brigade level surgeons, veterinarians, MSCs, nurses, dentists, PTs, PAs, and group, regiment, battalion medics, etc. Special kudos to our Reserve Component Soldiers, both national guard and army reserve. They are truly

exceptional soldiers who serve with us. I have particularly enjoyed my interactions with the national guard Special Forces groups and the civil affairs reserves.

Anyone who thinks they have an issue that I should work on when I get to Tampa (~1 JUN 06) - send me an email (farrwa@soc.mil; warner.farr1@us.army.mil). My job will be to be purple, non-parochial and OUT of the component surgeons (all of whom will be brand new) knickers, unless my CG directs otherwise!

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SGT Rocky Farr



Dan Wyman, MD
Col, USAF
Command Surgeon

AFSOC



This past November we hosted our first annual AFSOC/SG conference. I would like to thank all who attended...I believe we accomplished a lot. Over 50 medics from around AFSOC engaged in debate and exchange of ideas and visions. Topics included the new AFSOC-specific Individual First Aid Kit (IFAK), new AFSOC Instruction 48-101 (particularly new training requirements), operational psychology, UTC TOAs and logistics, CASEVAC, medical modernization, unit specific issues -- and much more. Discussions have continued since this conference and I am confident that they will lead to better delivery of healthcare throughout AFSOC.

Break, break...KNOWLEDGE IS POWER and knowledge can be gained in a variety of ways. These include formal education and formal training courses as well as informal education. Perhaps one of the most overlooked ways to expand your horizons is through reading -- personal, off-duty reading. I know everyone is extremely busy but I believe we all have enough minutes a day/hours a week to spend some engaged in "non-duty" reading. The first likely source is medical journals and periodical and trade craft magazines. In 30 minutes you can scan a few journals, identify articles of interest, and read a couple. A few pearls may come in handy during your next deployment or clinic session. I am a history buff so there is almost always some history book on my nightstand. *1776* was a pretty quick read and provided a unique view into George Washington and the American Revolutionary War. We are charged with serving and protecting the Constitution of the United States. Isn't it important that we have some insight into how and why the Constitution came about? How about Air Force heritage? There is a multitude to choose from. Last year I read Boyd: *The Fighter Pilot Who Changed the Art of War*. While this book is a bit long, it provides an interesting look into the life and accomplishments of Col Boyd, a famous (or infamous...probably depends on who you talk to) USAF Vietnam era fighter pilot who contributed to several advances in combat aviation. *Not a Good Day to Die* attempts to chronicle the events and decision-making of Operation Anaconda. Anyway, my point is we all benefit when individuals expand their horizons. Make a resolution to spend a few hours a week reading and enjoy.



Happy New Year! I am sure our incredible OPSTEM-PO will not recede during 2006 -- the continuing War of Terror will demand it. Please take care of yourself, your family, and your fellow Airmen, Soldiers, and Sailors and may God bless you and keep you safe!



SOFMH Authors Needed

We are looking for authors from various medical/operational specialties to write and/or update sections or chapters for the next edition of the Special Operations Forces Medical Handbook (SOFMH). If you are interested in volunteering your services as an author for the SOFMH 2nd edition, please contact Gay Thompson at gay.thompson@amedd.army.mil. She will furnish you with the necessary information for submitting your work. This is a voluntary effort. The intent is to make it as “painless” as possible for you while collecting the critical information that is required. All authors will be credited in the SOFMH 2nd edition.

Authors and co-authors are needed for the following sections:

Anesthesia Co-authors
Bites, Animal and Human
Breast Problems
Cardiac Problems
Cold Illnesses and Injuries
Dermatologic Problems Co-Authors
Dive Medicine – MAJ Robert Price has expressed interest
Endocrinologic Problems
Gynecologic Problems
Heat-Related Illnesses
Hematologic Problems/Blood Transfusions
Infectious Disease (other than STDs) Co-authors
Internal Medicine Co-author
Lab Procedures
Neurologic Problems Co-Author
Nursing Procedures
Pain Management
Pediatric Problems, Infant Feeding
Pulmonary Problems
Pharmacy
Radiology
Rheumatologic Problems
Sexually Transmitted Diseases
Surgical Procedures, Minor
UW Hospital

Authors will also be needed for the additional sections in the Gap Assessment that the SOCOM Surgeon and Component Surgeons believe are necessary. Once those sections are identified, we will need to solicit authors for them.

Gay D. Thompson, RN, MPH, CHES compiled this list to send out with the author instructions for the Special Operations Forces Medical Handbook 2nd edition. We thought everyone might find it helpful when writing your articles for submission to the JSOM.

Common Spelling Errors: Spelling is particularly important when a computer is utilized to search the text for a certain word. These are the correct spellings of some commonly misspelled medical terms. The “trouble spots” in the words are typed in **red**.

ab sc ess	diph th eria	mal ai se	ps o as
ac co mmodation	dy s ent er y	mal le olus	ps or iasis
acet am inophen	ec ch ymosis	malle u s	pu ru lent
album e n	el i cit	man eu ver	regim e n
amox i cillin	em ph ysema	mel an oma	resist an t
analges i c	em py ema	men or rhagia	rh yth m
aneur ys m	epi ph ysis	men str uation	rig or
anest h esia	epi st axis	migr ai ne	sag git al
an u s	ery th ema	mn e monic	saliv a
arrhythm i a	exac er bate	muc ou s (adjective)	scal e ne
arthrit i s	fasci i tis	muc u s (noun)	scar ri ng
asthma	fibrom ya lgia	myofasci a l	sci at ica
atres i a	fibrou s	neu ro logy	scl er a
axill ar y	filari as is	Novoc ai ne	sedent ar y
basal	foram e n	oph th almoscope	seiz ur e
basophil	fundu s cope	orient e d	somn ol ence
brachial	giardiasis	palat e	specim e n
breech	gonorr h ea	palli at ive	sph in cter
call u s (noun)	Guinea worm	parent er al	sph yg moman o meter
canker	helmin th	parox ys mal	stethoscope
cartilag e	hematoma	path og nomonic	suppur at e
cathet er	hemorrhoid	penicill i n	susceptib l e
cecum	hepatit i s	perineal	symmet ri cal
chancre	humer u s	peritoneum	syncope
cholera	hymen	peroneal	syphilis
chorea	hypn i c	persistent	tachypne a
chlamydia	iliopsoas	petechia (singular);	temporal
cocaine	ileu s	petechiae (plural)	tetan u s
codeine	ilium	phleg m	thelarche
colon	impetigo	plantar	thorac i c
conjunctiva	incontin e nce	pleur is y	tinnit u s
conscious	inflamm at ion	pneumococ cu s	tonsil
Crohn's disease	intussus ce ption	pneumonic	tonsill e ctomy
decubitus	lary nx	pore	urticaria
debridement	leukemia	preventive	varicose
diabetes mellitus	liquefy	prostate	vesicle
diaphragm	Lyme disease	prost h esis	vulva
diarr h ea	lymph	prurit i c	welt
dilation	lymphedema	prurit u s	wheal
			X-ray

Walking Donor Transfusion in a Far Forward Environment

Robert Malsby III, DO; James Frizzi, MD; Peter Ray, MD;
John Raff, MD

ABSTRACT

This case report details the walking donor transfusion (WDT) option for management of exsanguinating hemorrhage performed in an austere environment. It has civilian application in situations where local blood supply is overwhelmed by demand due to a natural or man made (e.g., terrorist) disaster. WDT is discussed in light of alternative transfusion techniques and the history of WDT is briefly discussed. We feel that walking donor transfusion is appropriate for use in extreme cases of patient exsanguination.

This article previously appeared in Southern Medical Journal. 98(8):809-810, August 2005. Permission was granted to republish in the JSOM.

OBJECTIVES:

1. Explain walking donor transfusion (WDT) options for management of exsanguinating hemorrhage in an austere environment.
2. Discuss civilian applications for WDT in situations where local blood supply is overwhelmed (i.e. natural or man made/terrorist disaster).
3. Understand and discuss the history of WDT.

Financial Disclosure:

The authors have indicated that, within the past two years, they have had no significant financial relationship with a commercial entity whose products/services are related to their topic subject matter.

INTRODUCTION

Patient care in the United States is envied worldwide by those who view American medical technology as miracles in action. With the onset of the Global War on Terrorism in 2001, U.S. military medical personnel have brought such miracles to places like Afghanistan and Iraq. Acting as ambassadors of goodwill and hope, American doctors, nurses, and medics save lives in austere conditions using medical technology that, while possibly considered crude or unrefined, nonetheless represent life itself to war weary nations. We present a case where Americans gave everything possible, including their own blood, to save a life in Afghanistan.

CASE DESCRIPTION

A 30-year-old male sustained a gunshot wound to the right mid-calf while in combat in

Afghanistan. One hour later he arrived by van at an American Aid Station with a profusely bleeding right lower extremity. While conscious on presentation, his Glasgow Coma Score quickly degraded to eight. Past medical history, surgical history, medication list, and drug allergies were unknown. No defined blood vessels at the wound site could be visualized for potential clamping or suture ligation. Pulses distal to the injury were absent. Hemorrhage was controlled with two tourniquets proximal to the wound and a pressure dressing. The patient underwent orotracheal intubation and insertion of two 18 gauge intravenous (IV) catheters. He lost his femoral pulse and blood pressure, and was noted to be in pulseless electrical activity (PEA) on the cardiac monitor. Treatment with two doses of IV epinephrine, closed chest compressions, and fluid boluses (5 L of 0.9% saline) resulted in a return of pulse and blood pressure.

Aeromedical evacuation was at least two hours but likely longer due to weather. Ground evacuation time to a U.S. military hospital was one to two days through hostile (enemy) territory. The patient was transfused with 450 mL of walking donor whole blood. His pulse strengthened and perfusion improved. Hemostasis was maintained at the wound site while an additional unit of whole blood was drawn from a different donor and administered without incident. The patient was flown to a U.S. Army Forward Surgical Team (FST) where additional blood products were transfused and a below knee amputation was performed for his nonviable lower extremity. The patient recovered without further incident and was seen in follow-up at the Aid Station four weeks later, neurologically intact and with normal cardiopulmonary and renal function.

DISCUSSION

The need to perform walking donor transfusion is an exceedingly rare event that has the potential to become more common. The key to successful utilization of this technique is planning. In a deployed environment, planning occurs in the pre-deployment phase by identifying O-negative and O-positive personnel. All potential donors are also screened for sexually transmitted diseases, viral illnesses, malaria exposure, etc. Supplies must already be in place for donor collection. Resuscitation with whole blood near the point of injury, after proper hemostasis, saves lives. The decision to pursue such high-risk transfusion is forced when the person remains unstable after crystalloid administration, evacuation time is prohibitive, and it is clear that the patient will die if not transfused immediately. Walking donor transfusions could be employed in other scenarios such as a mass casualty situation, when a local blood supply is exhausted, or when the blood holding facility itself is destroyed.

Since the discovery of major blood types by Landsteiner in 1900 and the recognition of the Rh factor in 1939, millions of transfusions have occurred safely.¹ The overwhelming majority of these transfusions are of preserved, banked blood components; thereby giving the patient only the blood product needed while maintaining the ability to provide any stocked blood component at any time. Nonetheless, banked blood (specifically packed red blood cells) is not without intrinsic challenges to the medical system. A modern blood repository is a large logistical facility with requirements for skilled staff, refrigeration, reagents, and space. While blood cell preserva-

tives have improved the storage capability of blood over several decades, the acid-citrate-dextrose (ACD), citrate-phosphate-dextrose (CPD), and citrate-phosphate-double-dextrose-adenine (CP2D-A) preservative systems may bind calcium or otherwise alter the recipient's medical condition. The banked red blood cell becomes relatively deficient in 2,3 diphosphoglycerate (2,3 DPG) and adenine triphosphate (ATP) which may change the red cell's ability to carry oxygen, thereby hindering the initial purpose of the transfusion.¹ These non-immune system principles of blood transfusion have prompted research into non-cellular oxygen carrying liquids that may be transported and stored at ambient temperatures, cause no recipient immune response, require no recipient replenishment of 2,3 DPG or ATP, and are cost-effective for widespread use.^{3,4} In the U.S. military medical system, these blood substitutes must remain stable despite 60 degree C heat and prolonged warehouse storage and competition for space aboard transport aircraft. Therefore, while research may result in non-blood oxygen carrying fluids for such scenarios (e.g., free hemoglobin bovine blood substitutes, et. al.), we feel the U.S. Army Medical Department physicians cannot rely on these products being delivered on time and in sufficient quantities. Furthermore, these blood substitutes are not without their own peculiar side-effects nor have they gained widespread approval throughout the world. Walking donor transfusions are currently a more viable option to the military provider in austere conditions with limited medical supplies and evacuation assets.

CONCLUSION

Blood transfusion practices in the United States are practically unparalleled in large parts of the world. While benefiting from modern transfusion practices and techniques remote from the battlefield, U.S. military physicians may be forced to use creative, non-traditional methods of transfusion in order to save lives in an austere environment. Further research into synthetic oxygen-carrying resuscitative fluids, prolonging the shelf life of walking donor blood and further simplifying the transfusion process would provide additional benefits to deployed American fighting forces and emergency disaster management personnel. In the continental United States, disaster planning scenarios should include walking blood donors, as traditional blood banking practices and facilities may be depleted or destroyed by terrorist attack.



MAJ Robert Malsby is residency trained and board certified in Family Medicine and received his training at Martin Army Community Hospital, Ft. Benning, Georgia. He is currently Battalion Surgeon, 7th Group Support Battalion, 7th Special Forces Group (Airborne) at Ft. Bragg, North Carolina.

Operational deployments include 3rd Battalion, Special Forces Group, Deh Rahwod Firebase, Afghanistan and as Other Coalition Forces Detachment Medical Officer, Salerno/Khwoost Valley, Afghanistan.

MAJ Peter Ray is in his senior year of fellowship in Plastic/Reconstructive Surgery at the University of Alabama at Birmingham and is Residency Trained/Board Certified in General Surgery. Deployment experience includes Commanding Officer, 525th Forward Surgical Team, Salerno Afghanistan.

CAPT John Raff is a Naval Reservist and is currently in private practice in Tennessee. He is residency trained in Orthopedic Surgery and Fellowship trained in Spinal Surgery.

MAJ (P) James D. Frizzi, is Chief of Trauma/Critical Care and Assistant Residency Director, Department of Surgery, Eisenhower Army Medical Center, Ft. Gordon, Georgia.

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Invited Commentary

The authors of Walking Donor Transfusion in a Far Forward Environment describe a patient presenting to them in profound hemorrhagic shock following a gunshot wound to the lower extremity. The patient underwent transfusion of two units of fresh whole blood following resuscitation with crystalloid fluid, intubation, and Advanced Cardiac Life-Support for hemorrhagic shock induced cardiac arrest.

This case raises several important points:)

First, the authors note the patient arrived an hour after his injury, bleeding profusely. No mention is made of any attempt at self-aid or buddy-aid prior to presentation. No bandage, tourniquet, or pressure dressing seems to have been applied. Since the Korean War, up to nine out of every hundred combat deaths have resulted from similar injuries. Rapid use of an effective tourniquet in this case would have prevented the progression to hemorrhagic shock over the subsequent hour. It also illustrates the importance of training every Soldier whether U.S., coalition, or host-nation, to perform self and buddy-aid hemorrhage control measures. The U.S. Army has recently adopted new field tourniquets and requires every Soldier to carry one, a significant step in preventing this leading cause of preventable battlefield death, but without adequate training in the aggressive management of hemorrhage on the battlefield this equipment will be useless.

The authors go on to mention that two tourniquets were applied proximal to the wound. This reviewer wonders why two were needed. Where these the One Handed Tourniquets (OHT) issued early in the war? If so, it is probable that one did not adequately control the bleeding. These tourniquets have subsequently been shown to have a high failure rate, especially when used on the lower extremity. Use of the OHTs should be abandoned.

The authors rightly state the need to perform walking donor blood transfusions is a rare event in a forward setting and that for it to be successful, planning is needed. This reviewer agrees with both points.

In this case the transfusion was probably lifesaving. It was performed in a secure non-tactical setting on a single patient whose source of bleeding had been controlled. The patient was in profound hemorrhagic shock facing a prolonged evacuation. It is well known that the difference between fatal and survivable hemorrhagic shock may hinge on a very small amount of additional blood once in hemorrhagic shock.

More challenging is the decision to transfuse in other situations. What about a patient with uncontrolled surgical bleeding of the chest, abdomen, or pelvis? Should transfusion be performed then if bleeding has not yet been controlled? As in this case, one to two units of blood will likely be all that is available to a small, forward-deployed element. Is that enough to make life-saving difference in a patient with significant, uncontrolled bleeding in the chest, abdomen, or pelvis?

Time is a critical factor. Finding the donor, even if pre-identified, preparing the transfusion bags, drawing, and then administering the blood take a significant amount of time. If the patient has a significant intra-abdominal or intra-thoracic hemorrhage they may very well exsanguinate before a transfusion can be performed.

If only one or no Type O donors are available, then type specific blood can be given, but cross-matching procedures are time consuming as well. Rapid bedside cards are available and may speed this process. For small tactical units such as Special Operations Teams, cross-matching of individual team members can be done prior to deployment.

Even if the procedure can be done in a timely fashion, the number of donors in a far forward setting are likely to be limited. How much blood can be safely drawn from combatants without risking decreased combat performance? Does one really want to donate even a unit of blood before going on foot patrol in the Afghan mountains?

The benefits of transfusions of fresh whole blood in patients in hemorrhagic shock are obvious and indisputable. In addition to volume and oxygen carrying capacity, fresh whole blood also replaces platelets and clotting factors. Soldiers do not bleed saline. But as the authors state this procedure will rarely be indicated and will require planning and preparation to be successful. As with any medical intervention performed in a military setting the benefits and risks must be balanced against the tactical situation. Had this patient been one of a dozen with combat operations ongoing, the management and final outcome of this particular patient might have been much different.

MAJ Robert L. Mabry, MD
Battalion Surgeon
First Special Forces Group

Guerrilla Warfare Medicine: A Review of the Literature and the Problem

Warner D. Farr, MD

ABSTRACT

The author reviews both the unconventional guerrilla warfare literature and the subset of medical guerrilla warfare literature. He identifies areas requiring further research and draws conclusions on the future directions of unconventional warfare medicine.

OBJECTIVES

1. Describe the extent of the medical guerrilla warfare literature.
2. Explain the difficulties of providing medical services to a guerrilla force.
3. Discuss current trends in the structures of unconventional warfare medical services.

Financial Disclosure:

The author has indicated that, within the past two years, he has had no significant financial relationship with a commercial entity whose products/services are related to his topic subject matter.

"The weakest part of a guerrilla force is its hospital unit..."

- Major Colin Dafoe¹

INTRODUCTION

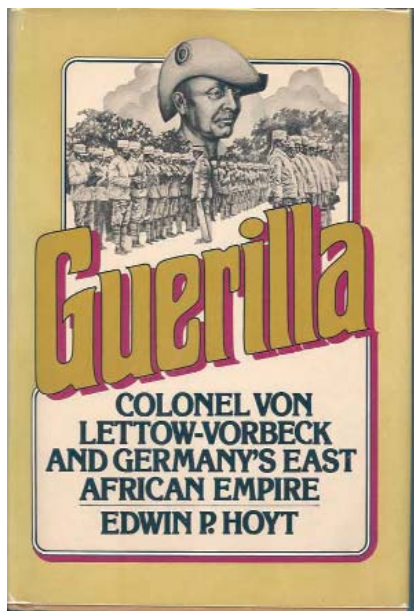
In general, books on guerrilla warfare contain much war and little medicine. First hand accounts radiate the author's bias, pose many questions, and provide few answers. For medical examples from which one may learn, look no further back than the late nineteenth or early twentieth century. Before then medicine had not advanced enough to either make a difference or for authors to record it as important, except in the case of epidemic disease. The origins of conventional military trauma evacuation and treatment as we know it date from the Napoleonic era of the late eighteenth century. Before the efforts of Baron Larrey, medical support was largely an afterthought. The unconventional warfare campaigns of Francis Marion, Robert Rogers, and John Singleton Mosby were largely unsupported medically.

While the literature on guerrilla warfare is quite extensive, the literature on guerrilla warfare medicine is scarce. The purpose of this article is not to teach but to encourage learning about guerrilla warfare medicine by highlighting published resources. It primarily reflects the author's personal library collection only.² This article is in no way comprehensive.

Historically, indigenous medics have provided most of the medical care and support to home-grown forces and, as a byproduct of the countries where these conflicts raged, most have not spoken English. When they were in a position to write (usually meaning if they won) former guerrillas mostly wrote of combat tactics and techniques, not logistics and medicine. Books on guerrilla campaigns span

not only the well-known conflicts such as Yugoslavia, France, Indochina, Malaysia, and Afghanistan but also less familiar venues such as Northern Ireland, Venezuela, Brazil, Algeria, Korea, Quebec, and Uruguay. Urban unconventional warfare is also its own subset with its own unique literature, as is guerrilla medicine. The foremost American urban guerrilla warfare outfit, never used but highly trained, was Detachment A, Berlin Brigade, a cold war Army Special Forces “stay-behind” unit.³

WORLD WAR I



used book markets in English, is *Guerilla* by Edwin P. Hoyt.⁴ *My Remembrances of East Africa* by von Lettow-Vorbeck himself is available in both English and German. For those with sufficient German skills, try *Meine Erinnerungen aus Ostafrika*.⁵ In reading the general’s medical comments, of which there are few, one finds that he used native women camp followers who accompanied his native troops to provide medical care. He believed that the German uniforms given to his African soldiers provided more protection against malaria than the British uniforms and that his soldiers were less susceptible to some disease than the opposition British troops. He highly praised his surgeons saying, “...the confidence even of the enemy in the German medical service was fully justified.”⁶ At the end of the war he found out that, although he had won his campaign, Germany had lost the war. Von Lettow was the consummate guerrilla leader who mastered the art of applying superior unconventional tactics to

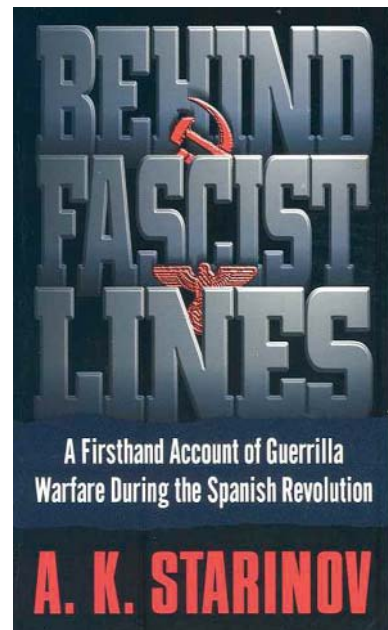
Looking first at World War I, General Paul Emil von Lettow-Vorbeck, the very talented German commander, and his native troops bested the British in the German East African colonies. An accessible book on this conflict, available in the

inflict great damage on his enemies while surviving in the field without adequate supply and managing a multi-racial combat force. One of his surgeons did write a book, which I have not yet been able to obtain, nor have I found it reviewed.⁷

The classic history of guerrilla warfare text, *War in the Shadows*, has high praise, still on the mark for an unconventional warfare leader:

*“He adopted and retained a simple and clear cut mission, one which his subordinates fully understood and one for which they were trained. He knew his natives, allowed them their customs, and offered them understanding, compassion, and success. He knew his country, and consistently paced operations to terrain and weather. He constantly improvised, never ceased experimenting with field expedients. Above all, he remained an indomitable commander who recognized but was not deterred by his own weakness, who gained strength when the enemy demanded surrender.”*⁸

THE SPANISH CIVIL WAR



As a dress rehearsal for World War II, the fascists and the communists squared off in Spain in the late 1930s. Behind the lines during the Spanish civil war, modern guerrilla warfare came of age. One good book by a Russian guerrilla fighter, Anna Starinov, tells the story.

In November 1936, Joseph Stalin sent Starinov with other Soviet advisers to help the Spanish overcome Ferdinand Franco. Assigned to a Russian demolitions and guerrilla-warfare expert as his interpreter, she soon found herself helping build effective partisan forces from scratch and showed talents as a guerrilla warrior and trainer. This pivotal role provides a memoir worth reading.⁹ Most of her medical accounts concern wounded civilians. The Spanish revolution became ground zero for modern warfare, as we know it. Many of the breakthroughs in

tactics, techniques, weapons, and modern unconventional warfare strategies used in World War II came from this Spanish conflict.

WORLD WAR II - YUGOSLAVIA AND GREECE

The European Theater in World War II had vast, differently organized guerrilla operations, typified by France and Yugoslavia. In Yugoslavia, there were two main and competing partisan forces: the communists and the royalists. In *The Creation and Development of the Yugoslav Army*, communist leader Josip Broz Tito writes:

*"... Besides this... our operations were closely linked with our wounded, who were always numerous, so that it was not possible to avoid encirclements, although the Supreme Headquarters were fully aware of the enemy's intentions."*¹⁰

Several other leaders in the communist guerrilla forces echo these comments. Major General Doctor Gojko Nikoliš remarks on the difficulties of guerrilla medical care:

*"Care of the wounded in partisan warfare is one of the most difficult problems for the rear, wherein the presence of wounded, as distinct from the regular army, often has a decisive effect on the planning and development of military operations."*¹¹

By far the best book on the medical aspects of these guerrilla forces is *Sanitetska Služba U Partizanskim U Slovim Ratovanja* by Colonel Doctor Djorđe Dragić. It was published in 1964¹² and later published in English as *Partisan Hospitals in Yugoslavia 1941-1945: Selected chapters from the book*.¹³ Colonel Dragić writes:

*"The presence of the sick and wounded notably reduces the mobility and manouevering ability of the units, these being vital conditions of partisan warfare.... Under the conditions of Guerrilla Warfare the importance of the human factor is also notably enhanced because... partisan units are... replaced on a voluntary basis. The attention to the medical services... is therefore understandable."*¹⁴

It seems to be a universal truth that confidence in an army's medical soldiers by other soldiers is essential for success, in both the conventional and the unconventional fight. This demands that an army

must have a medical service of some kind. Again, Colonel Dragić:

*"An organized medical service and the presence of medical workers in the units, and the care of the sick and wounded in general is an important moral-political factor which must be taken into consideration. Care of the wounded is also a positive factor where new fighters coming into the ranks...are concerned."*¹⁵

Tito's partisans, with Dragić and others leading his medical services, developed the medical and tactical aspects of an organization for partisan hospitals. Their hospitals in what they termed "free territory," areas close to the front lines, resembled base hospitals of conventional regular armies and were near communication lines. Medical officers noted that those hospitals near communication lines rendered prompt medical aid and provided lifesaving care to the critically injured quickly after battles but had the down side of possible rapid enemy penetration. In so-called inaccessible areas, areas where they thought the German forces would not easily penetrate, they stood up facilities that were more elaborate. Hospitals in the inaccessible areas enjoyed secrecy and maximal safety with the down side of difficult transport of wounded and loss of time and energy with many of the wounded arriving beyond salvage.¹⁶ This theme of delay equaling increased casualty mortality occurred again in the Afghan guerrilla forces as they faced the Soviets.

For all guerrilla medical forces, medical supplies are a huge issue. The Yugoslav guerrillas used as their main source of materials items seized from the enemy - the spoils of war.¹⁷ They augmented this with local resources and collection of medical stores from occupied territory. As time went on and the theater developed, manufacture and repair of medical items in partisan workshops developed as did acquisition of medical supplies from other parts of the partisan army (cross leveling of supplies) and Allied medical resupply flown or parachuted into the country. Young girls in the guerrilla auxiliary who could pass unsearched through German checkpoints transported medical supplies. Later in the war, the partisans actually staged special raids with the sole objective of collecting medical supplies from German forces.¹⁸

Colonel Dragić compared the guerrilla hospitals close to the communication lines and the guerrilla hospitals hidden in safe zones distant from the

fighting for their quality of medical care. The Otaševac Central Hospital, located in a forest on an isolated, secure mountaintop was well equipped and efficient but had a 15% mortality (16 of 112). In contrast, the Petrovac Hospital Center, located near communication lines, had a “First Surgical Ward” with a 4.2% mortality (33 of 700).¹⁹ As in many other things: location, location, and location.

They housed recuperating patients in wards carefully placed in underground caves and structures with snow or soil covered entrances but there was still the risk of discovery by roving German patrols. Here are the “rules governing behavior in underground shelters” issued by the headquarters of the Third Zone of Operations on 29 May 1944:

- “1. *The responsible person in charge ... is the male or female orderly.*
2. *The sick and wounded must obey all orders issued by the responsible hospital orderly*
3. *The orderlies may not open the entrance ... until ... informed ... that the enemy has withdrawn.*
4. *The sick and wounded must under no circumstances whatever open the entrance.*
5. *The sick and wounded cannot leave shelter without permission.*
6. *The male or female orderly ... is entitled to shoot wounded on the spot.”*

Rule 6 was in case the patients became restless with the German forces walking over their heads.²⁰

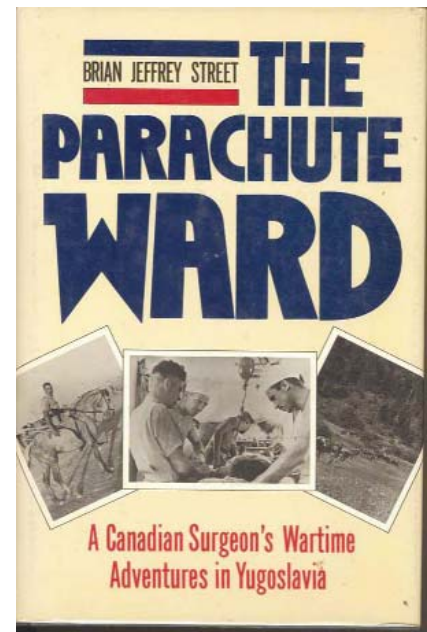
In *Development of the Medical Services in the Yugoslav Army*, Doctor Gojko Nikoliš gives principles for the organization of hospitals under conditions of partisan warfare:

- “1. *A heavy concentration of casualties in one place must not be permitted.*
2. *It is necessary to make all preparations for moving to another territory. Large-scale enemy offensives soon place the forest hospitals in jeopardy, in spite of inaccessibility. No place is inaccessible to the enemy.*
3. *For the purpose of ensuring the medical and military protection of the wounded the hospital system should be organized as follows:*
 - a. *The selection and clearing centre and surgical hospital near communication line, if possible in sheltered location not visible from the air;*
 - b. *After receiving surgical assistance the wounded should be sent to the hospital wards for treatment. The wards should be*

located at a distance from the communications lines, in places which are not vulnerable to air raids or tanks;

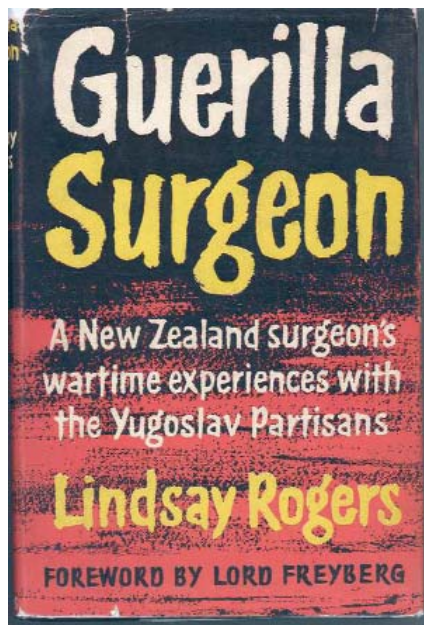
- c. *Reserve cabins should be placed deep in the forest, where the wounded will be concealed in case the enemy should penetrate along the communication lines;*
- d. *Secret hideouts should be built near the reserve cabins in case the enemy should gain control of the communications and begin infiltrating into the forest for the purpose of searching it.*²¹”

A most interesting issue in the Yugoslav partisan movements’ literature, which shows some applicability to today, is the use of allied forces forward surgical teams and other medical personnel infiltrated into the country by parachute or boat to augment local national medical guerrilla forces. One Canadian Army surgeon, Major Colin S. Dafoe, found his prior experience in the British 8th Army in North Africa very useful but also admitted to learning much about forward amputations from his German trained Yugoslavian communist partisan peers, confessing that the British army never did amputations that far forward in the evacuation echelons. Dafoe made his operating theater out



of used parachutes, hence the name of his biography, *The Parachute Ward: A Canadian Surgeon's Wartime Adventures in Yugoslavia*. Dafoe introduced into the fight blood plasma, which caused a stir the first time he used it without the need to cross match, and sulfa drugs. Doctor Dafoe died under mysterious circumstances in his native Canada with rumors, most probably unfounded, of a Central Intelligence Agency plot. The U.S. Army John F. Kennedy Center for Special Warfare did debrief him for three days in 1968. I could find no records of that debriefing in the school's archives.²²

Yet another team, headed by New Zealand Army Surgeon Lindsay Rogers, resulted in the autobiography *Guerilla Surgeon, A New Zealand Surgeon's Wartime Experiences with the Yugoslav Partisans*.²³ Rogers has many comments on Yugoslavian, primarily German trained, surgical



techniques. The partisan surgeons did not like Thomas leg splints and preferred casting, which resulted in bad pressure sores in the rudimentary guerrilla evacuation system and limb foreshortening. He also considered his fellow surgeons callous to their wounded, which put him at odds with Dragić, but his stories on underground hospitals support Dragić's book.²⁴ Both of these books are excellent to read and still available on the used book market. "Guerilla" is not spelled with two r's making *Guerilla Surgeon* sometimes challenging to find. *The Parachute Ward* has more background information as Rogers wrote *Guerilla Surgeon* directly after the war with the author writing from memory while *The Parachute Ward* came later with several years of research from Dafoe's unpublished journals, photographs, and interviews with people who had known Dafoe. There are many small lessons learned in both books but the biggest one is that successful resistance movements usually require some form of outside support. The British provided much to the Yugoslavian resistance movement by supplying arms, medical supplies, other equipment, and stellar special operations personnel like Dafoe and Rogers.

These two books compliment each other very well. The issue of forward surgical team support to insurgent forces is still a valid issue today. It would be useful to have this area explored by a contemporary special operations forces experienced surgeon. A former Airborne Forward Surgical Team Commander should study all three of these Yugoslav books and render a critical paper on what has and has not changed. Interestingly the Yugoslav guerrilla doctrine kept sur-

gical teams at divisional level but occasionally attached them to brigade level.²⁵

In one of those small world-Twilight Zone moments, I realized some years ago that my copy of the book on Yugoslav partisan hospitals by Colonel Dragić has his handwriting in the front. He inscribed it to "Major Dafoe" and it seems to have been the personal copy of Canadian Surgeon Major Colin Dafoe, the hero of *Parachute Ward*. It has the following inscription in blue fountain pen ink: "To Major Colin Dafoe as remembrance on the days spent together in the Staff of 38 division National Liberation Army of Yugoslavia with best wishes and kind regards of Dr. Dragić ... 10.10.1966."²⁶ In Dafoe's biography it says, "In December 1966, he received a copy of *Partisan Hospitals in Yugoslavia 1941-1945* by Dr. Djorđe Dragić."²⁷

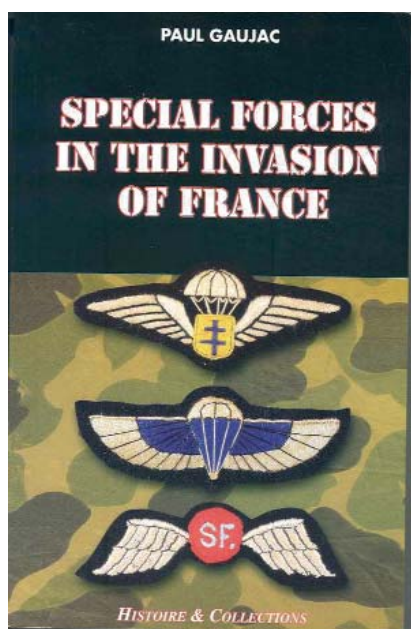
Yugoslavia, in summary, had multiple, highly developed guerrilla and auxiliary infrastructures, including medical services.²⁸ There had been little prewar medical infrastructure in this predominately rural country so the guerrilla movements created their own. They did have as an advantage the large areas of the rural countryside where the Germans were not concerned with full, oppressive occupation. Innovations included parachute infiltration of two allied forward surgical teams and allied fixed wing medical evacuation aircraft, which evacuated over 1,000 critical patients a night to Italy. Allied hospitals in Italy found evacuated patients riddled with diseases in addition to their wounds.²⁹

The Allies also provided assistance to guerrilla forces in Greece. At least one British and one American surgeon parachuted into Greece to assist the partisans. The guerrilla auxiliary supplied most of the native doctors and nurses with the allies dropping supplies by parachute.³⁰

WORLD WAR II - FRANCE

France, in contrast, was a much more highly developed country with a sophisticated pre-war medical infrastructure. It was a dedicated ally with short lines of communication, supply, and, importantly, air support from the United Kingdom. France was also vital to the war's success, with a common invasion border to Germany, a language spoken by many allied operatives, and a strong government in exile.

M.R.D. Foot is the standard on operations in occupied France. See also *Special Forces in the Invasion of France*.³¹ *SOE in France* has a few remarks of a medical nature: "By this time (Jan - May



1944) the administrative cares of the Maquis were beginning to weigh on the SOE as well as the French On the medical side some progress was possible ...”³²

In the American forces, the SOE equivalent was the Army Office of Strategic Services, the

OSS. The declassified official history of the OSS is available. It discusses medical and psychological selection issues.³³ An operations order dated 8 August 1944 called “Operational Brief #3,” sent Captain Fred B. Agee, Medical Corps, U.S. Army, on Operation Antagonist. The American OSS Operational Group under Captain Larson was working with a Maquis unit of 5,000 in Haute Vienne department in occupied France and had sent an urgent call for a doctor. The order reads:

“You will be parachuted in night of 10AUG. On arrival:

- 1. Work with Captain Larson*
- 2. Provide a MED service to Maquis members*
- 3. Assist in organizing such other MED services as available to serve Maquis*
- 4. Cooperate with any local doctors serving Maquis”*

Doctor Agee’s post mission report shows evacuation back to England by September 1944 after sustaining a pistol wound to the thigh and subsequent surgery in a French hospital.³⁴

One first hand account of a medical officer’s service with the SOE is *The Black Scalpel*.³⁵ Dr. Geoffrey Parker, a middle-aged British surgeon became an SOE major and served as a trauma surgeon, secret agent in Switzerland, and guerrilla leader in occupied France. His autobiography is a necessary read. For an account of a dentist who was also an OSS agent see *Piercing the Reich: The penetration of*

Nazi Germany by American secret agents during World War II.³⁶

Aaron Bank, the father of American Army Special Forces, served in the World War II OSS. His accounts of time spent on a Jedburgh team in France discuss medical aspects:

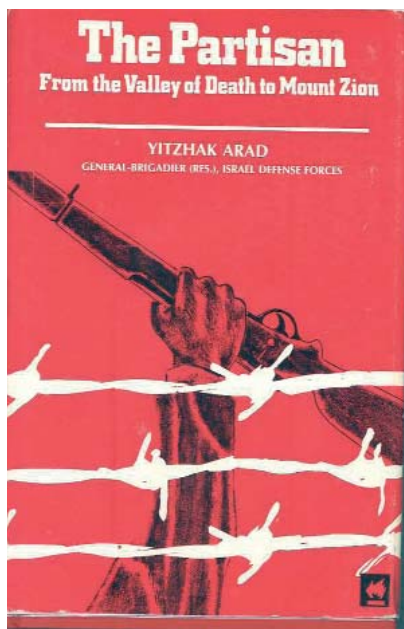
“... but better medical assistance was required. There was also a morale factor. The individual guerrilla would perform his battle duties with more ardor and spirit and accept more risks if he knew that there was medical support in case he became a casualty.”

Colonel Bank goes on to relate that he realized that the Maquis transported its casualties into urban areas to local clinics and hospitals and that the Gestapo conducted sweeps and captured the wounded. Bank created a medical network of safe houses and clandestine hospitals that he advertised to the Maquis, relating that, *“The leaders and couriers reported a definite lift in morale when the word got around.”*³⁷ It is interesting that a number of Jedburgh teams had medical codenames: Ammonia, Chloroform, Ephedrine, Novocain, and Quinine.³⁸

Personnel of the Schools and Training Branch, OSS at the end of World War II wrote *Selection of Personnel for Clandestine Operations. Assessment of Men*. Statistical calculations by dozens of psychologists and psychiatrists are the foundation of this book. Techniques developed are especially relevant for assessing candidates, both to identify disqualifying defects and for determining unusual talents.³⁹

WORLD WAR II - POLAND AND THE SOVIET UNION

After the blitzkrieg and partition of Poland, various anti-Nazi resistance groups sprang up in occupied Poland. Many were Jews escaping the Holocaust. One prominent account by a physician is *The Witch Doctor: Memoirs of a Partisan*. Dr. Michael Temchin not only recounts his life of first being drafted into the Polish Army, becoming a German prisoner of war and being released, but also leaping from a death camp train in 1942 to join the resistance. He relates a score of stories on other resistance physicians.⁴⁰ Another account of Eastern Europe guerrilla bands is *The Partisan: From the Valley of Death to Mount Zion* which covers Lithuania.⁴¹



Soviet partisan efforts against the Nazis were vast, with an insatiable requirement for infrastructure and supplies. In the first year of the war, stay-behind guerrillas subsisted on medical supplies left behind by retreating Soviet conventional forces and civilian authorities. Attempts to seize supplies from the

Germans were unsuccessful due to small amounts and good security. Aerial resupply was the main answer. In spite of scarce resources, numerous partisan hospitals existed.⁴²

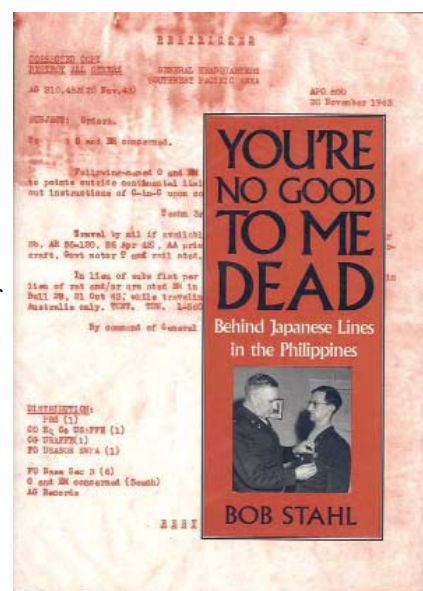
WORLD WAR II - PHILIPPINES AND THE FAR EAST

The other theater of war with large-scale guerrilla activities was the Pacific Theater, especially the Philippines. Military historians have written much less about this area than the European SOE/OSS deeds despite the fact that, of the Army Special Forces "Trinity" -- Colonels Bank, Volkmann, and Fertig -- the latter two both worked in the Philippines. Guerrilla operations there were of longer duration and suffered from a complete lack of command sponsorship, as General MacArthur would not allow the OSS command into his theater. What was underway in the Philippines were small groups of highly individualistic American military non-surrenders who decided on their own to learn guerrilla warfare through on-the-job training. They had for the most part, no training, no experience, no supplies, and no doctrine. They ran uncoordinated independent operations without a unified command's guidance.

These operations began in the disaster and defeat of the American encirclement, surrender, and internment and suffered from a lack of communications and long, sparse supply lines. General MacArthur had ordered a wait and watch role for those left behind, not an active combat role.

There are many untapped Filipino accounts of these operations that are mostly untouched by historians. For an account of the use of local Filipino medi-

cine in an American guerrilla band see *Behind Japanese Lines: An American Guerrilla in the Philippines*.⁴³ This story of guerrilla war in the Pacific concerns Ray Hunt, one of the few American soldiers on the Bataan Death March to escape.



Another American account by Lieutenant Colonel Edwin P. Ramsey is *Lieutenant Ramsey's War: From Horse Soldier to Guerrilla Commander*. Ramsey, during the fall of the Philippines, managed to lead probably the last horse cavalry charge in U.S. history. He decided not to surrender. He joined the resistance and rose to command more than 40,000 guerrillas. Ramsey was wholly self-taught, developed his own rules of war, and took no prisoners.⁴⁴ He spoke at a Special Forces Officer Course graduation at the United States Army John F. Kennedy Center for Special Warfare and School where he was awarded his Special Forces Tab and Green Beret for wartime service. In his talk, he discussed the importance of medical care as a motivating factor in guerrilla recruitment and morale.

Bernard Norling in *The Intrepid Guerrillas of North Luzon* describes a somewhat less successful guerrilla group in the occupied Philippines.⁴⁵ North Luzon has some of the worst terrain in the Philippines. Several Filipino-American guerrilla bands were organized and tried to gather intelligence and to destroy enemy military installations and supplies. This book concerns the Cagayan-Apayao Forces (CAF), commanded by Major Ralph Praeger. By 1943, most had fallen victim to combat, capture, or disease. Praeger's executive officer kept a diary and it contained transcripts of radio communications between the CAF and General MacArthur's headquarters in Australia. Many of the schemes, rivalries, mistrust, and outright betrayals between guerrilla groups center on disease, survival, or buying counterfeit medications, and show these forces unable to get

out of the pure survival mode. There is one account by an American medical officer describing attempts to make anti-malarials.⁴⁶ Guerrilla war in the Philippines continued into the 1950s with the Huk insurgency.

Another area with anti-Japanese resistance activity was in the British possession of Malaysia, north of Singapore. Famed primarily for the railroad that ran to the bridge over the river Kwai prisoner camps, some British soldiers escaped and taught themselves guerrilla warfare. A particularly good rendition is *The Jungle is Neutral* by Colonel F. Spencer Chapman, who had many trials and tribulations, including capture several times, as he acquired his guerrilla skills.⁴⁷ Malaysia was in the 1950s the scene of a successful counter-guerrilla operation.⁴⁸

POST-WORLD WAR II AND CHINA

After World War II, a wave of communist and communist inspired guerrilla movements began. One, Cuba, was even partially led by a physician, Dr. Che Guevara.⁴⁹ The Greek government with American aid successfully resisted the first post-war insurgency in Greece. During World War II, the conflict between the Nationalist Chinese forces, the Maoist guerrillas, and the Japanese had raged. With the Japanese out of the way, the battle escalated. Mao Tse Tung's book: *On Guerrilla Warfare*,⁵⁰ was required reading by all communist guerrilla movements on the 1950s and 1960s. It became the textbook for waging revolution in the emerging third world. Using fundamental disparities between agrarian and urban society, his doctrine changes deficits into advantages by using intelligence from the sympathetic peasant population, substituting deception, mobility, and surprise for superior firepower, and using retreat as an offensive move. A good general reference is Osanka's *Modern Guerrilla Warfare: Fighting Communist Guerrilla Movements, 1941-1961*.⁵¹ In communist inspired movements, there were three fundamental types of hospital organizations, which correspond to stages of development in the guerrilla's fight:

1. The Nomad Phase
2. Semi-Nomad Phase
3. A True Hospital Organization

In the Nomad Phase, the doctor or medic traveled constantly and was a combatant. The provider had the task of treating without the proper

means to treat, as the means did not always exist because of the dispersal, the immature tactical situation, and the lack of supply. Che Guevara stated that the medic "*brings the men necessary consolation from his poorly equipped knapsack.*"⁵²

In the Semi-Nomad Phase, the doctor or medic served in a guerrilla camp or an auxiliary house with stay-behind casualties. The knapsack had matured to a full set of emergency surgical equipment with a full operating room set in camp for "less hasty operations" and recuperation in denied areas.

Phase 3 was a true hospital organization set up in areas that the enemy did not control. This had a system organization with echelons of care, hygienists with a teaching function, laboratory, and x-ray services, and supplies captured from the enemy and/or obtained from the Red Cross. Mao's book has actual diagrams on the surgeon's staff position, medical unit organizational structure, and the exact number of individuals in the medical services for all sizes of guerrilla military units. It looks remarkably like conventional army force structure.⁵³

A Canadian surgeon, Dr. Norman Bethune, served in both the Spanish Civil War and the Chinese revolution. In Spain (1936-1937), he ran a blood transfusion unit and, in the spring of 1938, the Communist Parties of Canada and the United States sent him to China. In China, "Comrade Norman Bethune" was a thoracic surgeon and trainer of barefoot doctors. Chairman Mao sent him to the base area behind the enemy lines as Medical Advisor to the Shansi-Chahar-Hopei Military Area. He contracted blood poisoning while operating on wounded soldiers, and died on 12 November 1939 at Yellow Stone Village in Tanghsien County, Hopei Province. He is a hero in China but unknown elsewhere. He wrote several books on his Spanish and Chinese experiences. His comments on guerrilla warfare medicine include:

*"Mud walls, mud floor, mud bed. Smell of blood and chloroform; filthy bandages stuck to the skin with blood-glue. Men with wounds like little dry pools, caked with black-brown earth; wounds with torn edges frilled with black gangrene. Wounds expanding outward like decaying orchids or crushed carnations ... terrible flowers of flesh."*⁵⁴

It is quite interesting that Dafoe, of *The Parachute Ward*, a hero in Yugoslavia, and another Canadian surgeon, Dr. Norman Bethune, beloved in his adopted land as a key figure in Communist

China's guerrilla warfare struggle, are both virtually unknown in their native Canada.

THE COLD WAR

As various wars of national liberation blossomed under communist support to indigenous, native guerrilla movements, there were still other factions of guerrillas on the scene. At the close of World War II, certain groups of guerrilla fighters who had been opposing the Germans, the Soviets, or both, still existed. As Eastern Europe was quickly occupied by Soviet forces these organizations, primarily in Albania, Romania, Ukraine, Hungary, Poland, and some even within the Soviet Union, shifted from guerrilla warfare to espionage, subversion, and sabotage. The United States looked upon these groups as possible allies against the Soviets and the Central Intelligence Agency (CIA) spent considerable time, effort, and money in keeping contact with these eastern European groups. Both the United States and the Soviet Union secretly started to mobilize forces against each other and build intricate networks of spies. A secret American plan known as Rollback was "*an audacious strategy of espionage, subversion, and sabotage to foment insurrection in the Soviet satellite countries.*" The book *Operation Rollback: America's Secret War Behind the Iron Curtain* highlighted these secret efforts.⁵⁵ This possible theater for a future World War III started at a time when the OSS of World War II fame was dissolving into the CIA on the civilian side and into Army Special Forces on the military side.

The cold war led to the stationing of an Airborne Special Forces Group, the 10th, in Germany close to their predicted guerrilla warfare operational area (GWOA) of Eastern Europe ready for an operation codenamed "Falling Rain." Upon the outbreak of hostilities with the rapidly westerly moving Soviet forces, Special Forces Operational Detachment Alphas (ODAs) would parachute into Soviet occupied Eastern Europe to link up with the groups identified by the CIA and then wreak havoc miles behind the Soviet lines.⁵⁶

In addition, in support of such operations, America stationed an entire Army Special Forces unit in allied occupied West Berlin, deep in East Germany, behind Soviet lines. NATO strategically placed this unit, Detachment A, Berlin Brigade, to execute a stay-behind role as the Soviet Army rolled over Berlin, and other Soviet units headed west from occupied East Germany. The members of "Det. A", as it was usually referred to, were the consummate practitioners of urban guerrilla warfare both because it was their wartime mission and because they were in the perfect city to train for

it.⁵⁷ Detachment A remains the least known, most closely held, Special Forces operation and is only very rarely in the literature. Det. A stands as the earliest of the future special mission units having been known by a variety of ever changing unclassified unit designations. It appears that the other allied powers may have had similar units in West Berlin.⁵⁸ It is unknown if there were any possible planned actions in coordination with or because of the Hungarian revolution of 1956. Certainly many of the revolutionaries then found a home in European-based American Special Forces units afterwards.

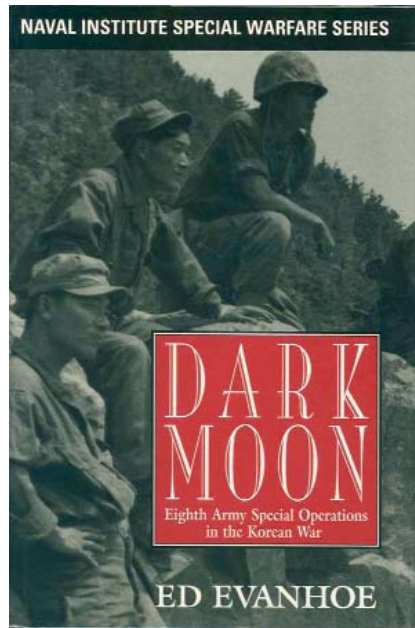
Even though some plans seem somewhat far-fetched today, in a post-cold war world, realize that there were significant forces opposed to the Soviets in Eastern Europe. In the Ukraine, a World War II resistance movement, the Ukrainian Insurgent Army (the UPA) lasted into the 1950s and has the distinction of having survivors who ultimately immigrated to Canada to very well document its history. They had sufficient combat power to take on division strength Soviet and Polish security forces into the late 1940s.⁵⁹ Detailed resources are available on their website.⁶⁰ In particular, they documented their medical services quite well.⁶¹ Volume 23 of their first series of books is *UPA Medical Services*.⁶² First developed in the early stages of World War II, the Ukrainian guerrilla medical services resembled the Yugoslav with underground depots and hospitals, ambulance schools, medicinal herb collections, and textbook publication centers. Tactics, techniques, and procedures (TTP) of interest included transporting wounded partisans blindfolded so, if later captured, they could not give away hospital locations; removing tracks and snow prints after passing with wounded; and taking as a very important duty the notification of the next of kin.

The allies of World War II began to write down much of the British-American-French doctrine on special operations after the war and held various meetings to dissect and explore wartime missions. This included the guerrilla warfare medical aspects with various conferences and journal articles. Dafoe spoke at an allied conference on war medicine about his experiences.⁶³ The American Army began to publish articles and manuals on guerrilla warfare, auxiliaries, and counterinsurgency.⁶⁴ These have been updated to the present, both unclassified and classified. I plan to save the subject of American unconventional warfare military manuals and doctrine for another article on that specialized governmental literature. One theme from World War II was the two systems of hospitalization: the Yugoslav system of larger more isolated facilities

and the French system of smaller more clandestine facilities.

THE KOREAN WAR

While the cold war raged in divided Europe, a hotter war started on the Korean peninsula. Authors have recently published several books on the guerrilla warfare activities in the Korean War. In *Dark Moon: Eighth Army Special Operations in the*



Korean War, Ed Evanhoe documents the efforts of the Allied guerrilla warfare effort through the innocuously named 8240th Army Unit.⁶⁵ Also operating was the United Nations Partisan Infantry Korea (UNPIK) with eleven partisan battalions, including a bat-

talion known as the White Tigers. That battalion is the subject of *White Tigers: My Secret War in North Korea*.⁶⁶

Neither book is long on medical tales, but there are a few good parts of an operations order which bear quoting:

"5. Medical Support: Medical Support will continue as at present unless the UN forces become heavily engaged in a major offensive with its resultant casualties. Wounded can be evacuated by air to the 121st Hospital at Yongdongp'o where they will receive the same medical treatment as U.S. wounded. Advanced treatment will normally be given at the Italian Red Cross Hospital or the Korean hospital. Local medical support is believed to be adequate for our current needs. You will continue to exploit the services of Korean doctors. Emergency copter lift is available upon radio request."

In addition, one non-medical item of fascination:

"11. North Korean Currency: Due to the large requirements for North Korean currency and the limited sources available, commanders will encourage

bank robberies and other suitable means of procuring this currency.

Signed: J.Y.D. Vanderpool

Lt. Col. Artillery

Officer in Command"lxv

VIETNAM

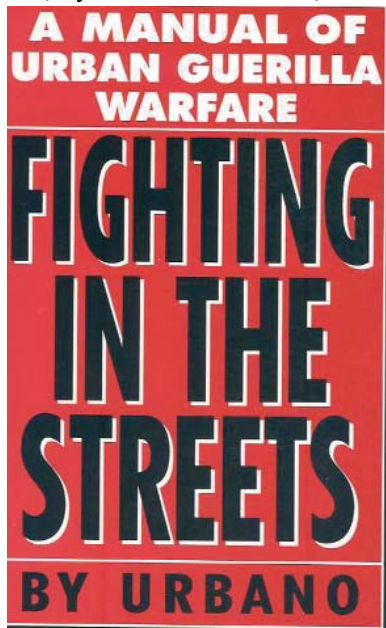
America used Special Forces primarily in a counterinsurgency role. As they used indigenous troops, Special Forces developed a sophisticated "Civilian Irregular Defense Group" (CIDG) clinic and hospital system throughout the country to care for the wounded without entering them into the South Vietnamese military medical hospital system. Some were occasionally evacuated into the South Vietnamese system and rarely one entered into the American military evacuation system. Infrequently, Americans were cared for in the CIDG system.⁶⁸ This issue of indigenous forces and evacuation policies will emerge again as an issue in Afghanistan. Special Forces medicine was for the most part conventional medicine. Special Forces medics practiced under indirect supervision by general medical officers on indigenous troops. Part of the Special Forces effort in Vietnam, the Military Assistance Command - Vietnam's Studies and Observations Group (MACV-SOG) had a very dangerous direct action and strategic reconnaissance cross border mission. This tri-service plus CIA unit foreshadowed the special operations joint commands of today. Subsequent to declassification of their dramatic exploits, John Plaster and others have written several excellent books but no one has yet written an account of SOG medicine.

The South Vietnamese communist guerrillas, later pushed aside by North Vietnamese regulars, had underground guerrilla hospitals and there is one account by an American Green Beret physician concerning them.⁶⁹ They were truly underground, located in labyrinthine cave and tunnel systems as well as being "underground" in a clandestine sense. These underground hospitals suffered from a lack of intravenous fluids, slow evacuation times, and minimal care at en route aid stations.⁷⁰ The Marquette Library at the United States Army John F. Kennedy Center for Special Warfare and School has the Louis Dorogi Collection of over 80 oral histories and photographs of Special Forces medicine in South Vietnam.⁷¹

URBAN GUERRILLA WARFARE

Another area in the guerrilla warfare literature is the subset of urban guerrilla warfare but few

books on this type of warfare exist. The foremost American urban guerrilla warfare unit, Detachment A, Berlin Brigade, was discussed in the cold war section. One is *The War for the Cities* by Robert Moss. His book covers urban guerrilla movements in Russia, Guatemala, Cyprus, Brazil, Algeria, India, the USA, Uruguay, Ulster (Northern Ireland), Quebec, and Venezuela. Some of those locations may be surprising. For the USA he lists the American Weathermen Underground and for Canada, the Quebec Liberation Front as guerrilla groups. He points out the vulnerabilities of the modern city to the tactics of “the new revolutionaries.”⁷² One urban guerrilla warfare manual, by a South American, Urbano, is *Fighting in the*



Streets: A Manual of Urban Guerrilla Warfare. In it the author writes, “The most common operations carried out by urban guerrillas are raids on arsenals and medical supply houses to obtain needed weapons and materials ...”⁷³

This is clearly an area for medical intelligence operations. In addition

to a study of Peruvian guerrillas who turned urban, the Shining Path guerrillas,⁷⁴ research institutes like the RAND Corporation are studying urban warfare as a new battleground for conventional armies.⁷⁵ There are few good writings on urban guerrilla warfare medical support. One, which covers using enemy medical assets for partisans, is *The Minimanual of the Urban Guerrilla*.⁷⁶ Clearly, cities are fertile ground for finding existing medical structure, expertise, and supplies. Urban guerrilla movements may decide to use the existing medical infrastructure and just not have an organic medical capability. Deft guerrilla movements could obtain everything from medical care to unemployment compensation from the infrastructure that they are fighting. Literature is emerging on “feral cities.” Cities that might break down into cities portrayed in apocalyptic movies and certain science-fiction genres, but with continued global connections. Possessing commercial linkages, inhabitants would

have access to the world’s most modern communication and computing technologies but at the same time without sufficient infrastructure. Present day Mogadishu, Somalia, may show these indications.⁷⁷

AFGHANISTAN

In Afghanistan, the guerrilla war against the Soviets in the 1980s has some mention of the medical aspects of the conflict. “We treat our wounded warriors that they might fight again” is a quote by Afghan resistance fighter and physician Dr. Guhram Farooq.⁷⁸ Few medical articles attempt to study scientifically the casualties from unconventional wars. In “Trauma in the Afghan guerrilla war: Effects of lack of access to care”, the authors look at relative rates of injury to various body parts in military conflicts expressed as a ratio of critical area versus extremity where critical area is defined as head, neck, thorax, or abdomen:

WWII	0.49
Korea	0.46
Vietnam	0.50
Thailand	0.39
Falklands	0.48
Afghanistan	0.071 ⁷⁹

This study shows that the system of transporting wounded long distances to Pakistani hospitals favored extremity wounds over critical area wounds. The data shows critical area wounds under-represented as the patients died en route. Afghanistan’s Soviet guerrilla war, with very little indigenous guerrilla medical infrastructure⁸⁰ stands in stark contrast to the sophisticated guerrilla medical organizations of some of the earlier guerrilla movements, and the lack of close-to-the-battlefield care shows in these survival statistics.

There was at least one attempt at a Forward Surgical Team concept in this war. The Norwegians sent a volunteer civilian bicycle mounted team of three: a general surgeon, scrub nurse-midwife, and nurse anesthetists. All their equipment fitted on their bicycles.

Sometimes lessons learned are obvious:

“Only three operations were performed on the floor, among them a laparotomy. We strongly recommend the use of a stretcher or a table to get the patient up off the floor. Kneeling while performing major operations is tiresome and difficult.”⁸¹

CONCLUSIONS

We need continued debate on how much medical capability a commander should resource in his guerrilla warfare operational area. Current U.S. Army doctrine states that wounded personnel of surrogate forces led by the United States should not enter into the American military evacuation system. However, American Special Forces did not always follow this doctrine in the unconventional war in Afghanistan in late 2001 and early 2002.⁸² If American policy shifts toward support of more surrogate forces, with or without American leadership, indigenous force medical support needs to be re-addressed. Recent RAND reports address these issues. One is "Trends in Outside Support for Insurgent Movements." It lists a priority of important outside support to insurgencies. First is safe haven, which includes medical recuperation, money, political support, and direct military support. It found training, weapons, and foreign fighters (causes loss of nationalist credibility) less helpful.⁸³

There are several trends to note in the guerrilla warfare medical literature. It is a universal truth that a guerrilla force must have a medical service to instill faith in the soldiers and the cause. Hospital facilities vary with the tactical situation from clandestine decentralized systems with cut-outs and blind drops in urban settlements to remote facilities in remote areas with security from the rural location. Supply issues loom large with captured supplies from dedicated raids being common. Another frequent theme is the distance of evacuation routes and their effect on survivability. The use of outside specialty medics, e.g., forward surgical teams, is also repetitive throughout the wars beginning with World War II. Sources of trained medical personnel are co-opting local physicians and others in situ, re-inserting local national personnel or inserting outside allied, as in American, medical personnel.

In summary, further exploration of the available literature on guerrilla war will highlight more lessons learned and gain us valuable knowledge. This is literature rich in accounts of combat tactics and techniques, but relatively poor in details of unconventional warfare medicine. What medical literature there is has much first person bias, little Air Force or Navy data, and provides many more tantalizing questions than it gives significant answers. Areas that need to be further researched include:

1. The required echelons for guerrilla medical services
2. The level of interface with conventional forces or civilian medical evacuation systems
3. The types, location, tactics, and services of guerrilla hospitals
4. The staffing of guerrilla hospitals (local nationals versus others)
5. The trend toward less medicine in the GWOA and the effect of long evacuation times
6. Urban guerrilla medicine support

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Stress Fracture and Attrition in Basic Underwater Demolition SEAL Trainees

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ABSTRACT

The Basic Underwater Demolition SEAL (BUD/S) training program is a six-month rigorous program that prepares trainees for specialized instruction before being assigned to a SEAL team. Two major but separate issues affect this program: stress fractures and attrition. Stress fracture rates are around 5-9% and may lead to attrition or training delays. Ultimately, only about 25% of trainees complete the program. The purpose of this study was to examine both stress fractures and attrition outcomes among BUD/S trainees by evaluating a combination of administrative records and self-reported health behavior data. **Methods:** The study was conducted at the Naval Special Warfare Center (NAVSPECWARCEN) BUD/S training program in Coronado, California, between April 2002 and November 2003 (classes 241 to 249). The trainees (n = 1046) were followed from the start of training to graduation (at least six months) or attrition. A 33-item health habits questionnaire was administered to the trainees upon entry. Other data sources included BUD/S training records, the NAVSPECWARCEN Command Information Management System, the Naval Medical Center San Diego medical and radiological database, and the Career History Archival Medical and Personnel System. **Results:** During the training period, 72 men (6.9%) incurred at least one stress fracture or stress reaction. Men reporting shin pain “most or all of the time” (potentially indicating recent or existing injury) on the baseline questionnaire had three times the risk of developing a stress fracture during training, even after controlling for low body mass index (BMI). Running pace, frequency, and age were not associated with stress fractures. For attrition outcomes, only 26% of the trainees graduated and half of those men took more than 263 days to finish the program. Successful graduates were more likely to have high BMI, high education, officer rank, and the modifiable factors were self-reported measures of fitness, intensity of workouts, ability to do more than 10 pull-ups, and never smoking tobacco. Not all factors were equally associated with on-time graduation, delayed graduation, and overall graduation. Many of the self-reported behaviors were associated with overall graduation, but only the ability to do more than 10 pull-ups was associated with on-time graduation. Stress fracture occurrence was associated with delayed graduation, but not with overall graduation. **Discussion:** Very few of the expected risk factors were found for stress fractures in this population. The attrition analyses found differences in risk factors between those who graduated on time, late, and not at all. **Conclusions:** Future studies should analyze training days of exposure to further explore the timing and risk factors for stress fractures. However, a better understanding of stress fractures, though valuable in itself, will not necessarily clarify attrition. The large number of voluntary drops contributed substantially to a low graduation rate and should be the focus of future studies.

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INTRODUCTION

Stress fractures are a significant problem in basic military training programs.^{1,2} Even though the rates of stress fracture have diminished dramatically in Navy and Marine Corps recruit training by applying physical training modifications, stress fracture incidence in Basic Underwater Demolition SEAL (BUD/S) trainees remains unchanged.³ According to BUD/S injury databases, as many as 40% will be diagnosed with overuse injuries during their 6-month training program and as many as 16% of trainees attrite due to stress fractures.⁴ This stress fracture rate is 9-times higher than Navy recruits and 3.5-times higher than Marine Corps recruit training populations.⁵ The numbers of BUD/S trainees requiring training delays or who are medically dropped from the SEAL basic qualification pipeline secondary to stress fractures is not trivial. However, attrition due to medical drops represents only a small portion of the approximately 75% of trainees who do not finish BUD/S training. The present study examines the role of various pretraining health behaviors and physical exercise habits on risk of stress fracture and attrition during BUD/S training.

Methods

Participants

The study was conducted at the Naval Special Warfare Center (NAVSPECWARCEN) BUD/S training program in Coronado, California. The trainees were followed from the start of training (INDOC; indoctrination weeks 1 to 5) to graduation (at least six-months) or attrition. All incoming BUD/S trainees who entered between April 2002 and November 2003 (classes 241 through 249) were recruited for the study (n = 1330). Potential participants were briefed on the study by Naval Health Research Center staff. Volunteers reviewed and signed the consent document, and they received the privacy act statement and a copy of consent form according to the guidelines of the approving Institutional Review Board (protocol number NHRC.2003.0007). BUD/S training staff members were not present during the recruitment or consenting process. A total of 1064 trainees agreed to participate in the study (80% participation rate). For the purpose of this analysis, 18 foreign BUD/S trainees were excluded due to differing BUD/S training protocols and standards, resulting in a study sample size of 1046 trainees. During the first medical visit of BUD/S INDOC training, consenting participants were administered a 33-item health history question-

naire. BUD/S enlisted medical staff assisted in administering the questionnaire.

Data Collection

Several sources were utilized to collect descriptive, exposure, and outcome data for the trainees: BUD/S training records, the NAVSPECWARCEN Command Information Management System (CIMS), the Naval Medical Center San Diego (NMCS D) medical and radiological database, the Career History Archival Medical and Personnel System (CHAMPS),⁶ and the 33-item health habit questionnaire administered to the trainees upon entry into training. From the CHAMPS database, which contains career event and medical information for military personnel, data were collected on race/ethnicity, education, months of military service, and scores on the Armed Forces Qualification Test (AFQT). From the CIMS training records, information was collected including the trainee's naval rank status (enlisted, officer, or allied), recruiting source (schools or fleet), and physical fitness scores.

Outcome Variables

Stress fracture data: BUD/S participants were assessed throughout their training program for occurrence of lower extremity musculoskeletal injuries, with specific attention to stress fractures and stress reactions. All musculoskeletal injuries were evaluated on site at the branch medical clinic (BMC) by a corpsman, physician's assistant, or physician. All suspected stress fractures were referred by the BMC licensed medical staff to the radiology department at the nearby Naval Medical Center San Diego (NMCS D) for confirmation by x-ray, triple phase bone scan, or magnetic resonance imaging (MRI) scan. The NMCS D senior staff radiologist confirmed all stress fractures. Stress fracture was defined as one or more partial or complete hairline fractures usually due to chronic pounding on nondiseased bone at any lower limb site, and a stress reaction is an impending stress fracture that does not involve disruption of the structure of the bone and does not meet the definition of a stress fracture. For this study, stress fractures and stress reactions were grouped together into a single stress fracture category. Identifiers for all 1046 enrolled subjects were entered into the NMCS D database (Composite Health Care System II) looking for the presence of a radiology report. Radiology records for study subjects were electronically extracted from the hospital database and reviewed for medically confirmed stress fracture or

reaction diagnoses at the completion of training or time of separation.

The diagnosis of a stress fracture is complicated by (a) the lack of consensus in clinical medicine about the diagnostic criteria for stress fractures, (b) the use of several clinical terms interchangeably to describe the condition (e.g., stress reaction, fatigue fracture, and pathologic fracture), (c) the use of radiographs to rule out frank fractures may not always confirm a stress fracture, and (d) the progression of stress fractures in stages, with diagnostic criteria often including a history of localized pain of insidious onset, which worsens with progressive activity and is relieved by rest.⁷ The BUD/S medical staff is trained to identify potential stress fractures early and reduce the impact on attrition. The BUD/S medical staff amelioration strategy is to treat diagnosed stress reactions before they develop into a stress fracture. Doing so can decrease the number of diagnosed stress fractures and result in fewer days out of training. The general consensus among the BUD/S medical staff is that the stress reactions would probably have developed into a stress fracture had this secondary prevention strategy not been used. For this reason the investigators pooled stress reaction and stress fracture into a single injury category.

Graduation and attrition data: BUD/S training records (CIMS) were used to provide detailed chronological information on program status of the BUD/S trainees. The data extracted from the training records included event (graduation or attrition), date of event, and type of attrition (voluntary drop out of training on request (DOR), performance drop, medical drop, or administrative drop). Two categories of graduation were created: those who graduated within 263 days of training (on time graduation) and those graduated after 263 days of training (delayed graduation).

Exposure Variables

The sources of data to obtain the demographic and personal characteristics of the trainees are as follows: age (survey), race/ethnicity, education and AFQT scores (CHAMPS), rank, months of service, and recruiting source (CIMS training record). The NAVSPECWARCEN medical staff measured height and weight during INDOC. Body mass index (BMI) was calculated as weight (in kilograms) divided by the square of height (in meters). For analysis, BMI was used as a continuous variable.

All incoming BUD/S trainees are required to complete a Physical Fitness Test (PFT) to assess

minimal physical fitness. The PFT is administered during INDOC to ensure that incoming trainees meet the minimum standards for advancement to regular training. During the data collection period of the study, a BUD/S training program procedural change was implemented such that the documentation of PFT scores was changed to specify pass or fail rather than recording the actual time or number. This change resulted in 412 (39%) trainees without actual times or numbers for PFT performance tests, so this measure could not be used in the analysis.

Using information collected from the study questionnaire, current physical fitness level was self-assessed as poor, fair, good, very good, and excellent. For analysis, this variable was dichotomized into two categories: “excellent/very good fitness” and “poor/fair/good fitness.” The questionnaire also collected information on those who reported that they “worked up a good sweat” most or all of the time when they exercised and those who reported that they could do more than 10 pull-ups.

In addition, trainees were asked several questions about their exercise habits during the 2 to 3 months prior to attending BUD/S training. These questions included information on whether the trainee increased his level of exercise or sport, exercised or played sports at least four times a week, and ran or jogged at least four times a week. For those who reported running or jogging at least four times a week, the average running pace (minutes per mile) was calculated from average distance run and time of average run, and they were asked to report how much they enjoyed running. Trainees were also asked if they participated in any lower and upper body stretching and lower and upper body weight training. These two variables were combined for analysis (doing either lower body stretching or weight training at least two times per week).

The questionnaire also assessed self-reported use of smoking tobacco and alcohol (e.g., beer, wine, and/or liquor/mixed drinks). Responses for smoking tobacco use included “never smoked tobacco,” “former smoker” (having not smoked in the past year), and “current smoker.” Because of the small number of current smokers, two categories were created: “never smoked” and “ever smoked” (which included past smokers and current smokers). For alcohol use, the responses to various questions on consumption were combined to make two categories of “never used any type of alcohol” and “ever used any type of alcohol.”

Previous lower body musculoskeletal injuries were defined as any injury of the bone, muscle, tendon,

ligament, and/or cartilage that occurred in the lower limbs. Using the study questionnaire, trainees who reported any lower body musculoskeletal injuries prior to BUD/S training provided additional answers to questions, such as “Did the injury result in disability for at least one week” and, “Following the injury, were you able to return 100% to normal physical activity?” and “Did a health care provider ever tell you that you have a stress fracture in one or both of your lower limbs?” Finally, all trainees were asked to report if they were currently experiencing shin pain during or following physical activity in either their right or left shin (most/all the time).

Statistical Analyses

SPSS statistical software (SPSS, Inc., Chicago, IL, version 11.0) was used to analyze the data. Descriptive statistics were used to characterize participating trainees. Descriptive data included means and standard deviations or percentages. Means and standard deviations for continuous variables, such as age, height, weight, BMI, and running pace, were calculated by stress fracture and graduation status. Univariate logistic models were used to identify statistically significant differences between stress fracture status and each of the demographic and health behavior variables. Multivariable logistic regression models were developed to assess the combined effect of statistically significant variables while controlling for possible confounding variables. Odds ratios were calculated. An odds ratio helps illustrate whether members of specific groups have an increased likelihood (or odds) for developing the outcome of interest based on their exposure characteristics. An odds ratio of 1.0 means there is no association between exposure group and the outcome of interest. In all cases, statistical significance was determined by 95% confidence intervals that did not include 1.0. For the attrition data, logistic regression and polychotomous logistic regression techniques were used to assess the relationship of graduating versus not graduating, as well as comparing graduating on time and delayed graduation versus attrition for each of the demographic and health behavior variables.

RESULTS

Injury Outcomes

During the BUD/S training, a total of 96 bone injuries (50 stress reactions, 36 stress fractures, and 10 frank fractures) occurred in 80 (7.6%) of the 1046 trainees; some had more than one injury. Seventy-two (6.9%) of the 1046 trainees incurred at least one stress

fracture or stress reaction; 51 men (4.9%) incurred a stress reaction and 45 men (4.3%) incurred a stress fracture.

The average age of the trainees was 23 years and did not vary by stress fracture status. Overall mean BMI was 24.9 with a standard deviation of 2.1. Men with a stress fracture during training had a lower baseline BMI than those without ($p < 0.05$). The majority of the trainees were Caucasian, non-Hispanic (80%), followed by Hispanic (9%), Asian/Pacific Islanders/Native Americans (6%), and African American, non-Hispanic (4%). Stress fracture risk did not vary by racial/ethnic group. Approximately 81% of the trainees had earned a high school diploma/GED, and 18% had completed some college course work or earned a 2- or 4-year college degree. The majority of the trainees (94%) were enlisted rank and the remaining 6% were U.S. Navy officers. More than half of the trainees had been in the service less than 9 months. About two thirds of the trainees came from the fleet, and the most common AFQT category was Category II (65th to 92nd percentile) representing more than half the trainees. None of these variables were associated with stress fractures. While physical fitness scores were available for only 61% (634) of the sample and could not be included in the modeling, none of the differences in swimming, push-ups, sit-ups, pull-ups, or running time were statistically different between those with and without a stress fracture.

In general, the trainees reported fairly good health behaviors: 55% reported very good or excellent physical fitness compared with others their age, and 39% reported working up a sweat most or all of the time during exercise. Eighty-four percent reported that they could do more than 10 pull-ups. Over 90% of the trainees reported exercising four or more times a week, and almost 70% reported running four or more times per week during the two to three months prior to BUD/S training. More than half of the trainees (54%) reported increasing their exercise level during the months prior to training. In addition to running, just over half of the trainees reported lower body weight training or stretching at least two times per week. Twenty-two percent of the trainees reported ever smoking cigarettes while most trainees (80%) report ever using alcohol. However, none of the self-reported health behaviors were associated with stress fractures.

Current shin pain was the only variable associated with stress fracture; trainees reporting shin pain at baseline had about three times the risk of

stress fracture compared with those without shin pain (13% of those with stress fracture reported shin pain most or all of the time compared with only 5% of those without stress fracture). The other injury variables (previous lower body injury, severity and recuperation from previous injury, or previous stress fracture) did not vary by stress fracture status. The statistically significant variables in the univariate analyses (BMI and current shin pain) were used to build a logistic model for stress fracture. The results, shown in Table 1, show that presence of shin pain and BMI (lighter men) are both independently related to the occurrence of stress fracture during BUD/S training.

TABLE I: MULTIVARIATE LOGISTIC REGRESSION OF U.S. NAVY BUD/S TRAINEES BY STRESS FRACTURE STATUS, N = 1046

<i>Characteristic</i>	<i>OR*</i>	<i>95% CI*</i>
<i>Physical/personal</i>		
BMI**	0.9	(0.8, 0.9)
<i>Injury history</i>		
Currently feels shin pain a lot/most of the time		
No	1.0	
Yes	2.9	(1.4, 6.3)

* Odds ratio and 95% confidence interval for the odds ratio. An odds ratio of 1.0 signifies no association between the characteristics and stress fracture. An odds ratio of over 1.0 indicates a higher risk while an odds ratio below 1.0 indicates a lower risk. If the 95% confidence interval does not include 1.0 then the odds ratio is meaningful.

** BMI-Body mass index (weight (kg)/height (m)²).

Bolded figures indicate statistical significance.

Attrition Outcomes

Overall, 274 (26%) of the trainees in our study sample graduated from the BUD/S training program. About half of the trainees graduated on time (defined as within 263 days), with the remainder graduating at some later point. Among the 772 men (74%) who did not complete the BUD/S training program, 83% DOR, 10% dropped for medical reasons, 6% dropped for performance issues, 1% dropped for administrative (discipline) issues, and two men 0.2% were aboard at the time of analysis (560 days, 637 days). For analysis purposes of this study, the two aboard trainees were designated as men who did not complete the BUD/S training program (Table 2).

TABLE II: GRADUATION STATUS OF U.S. NAVY BUD/S TRAINEES, N = 1046

<i>Graduation Status</i>	<i>n</i>	<i>%</i>
Graduated	274	26.2
On time (within 263 days)	138	50.4
Delayed (beyond 263 days)	136	49.6
Did not graduate	772	73.8
Dropped on request (DOR)	642	83.2
Medical drop	75	9.7
Performance drop	43	5.6
Administrative drop	10	1.3
Aboard*	2	0.2

* Indicates subjects who had not completed BUD/S training as of 6/16/05.

Overall, men with high BMI, at least some college, officer rank, and who reported that they had excellent/very good physical fitness, worked up a sweat most of the time during exercise, could do more than 10 pull-ups, exercised four or more times per week, ran or jogged four or more times per week and never smoked tobacco were more likely to graduate from BUD/S training. Among those who ran or jogged four or more times per week, a fast running pace, and enjoying running were both associated with overall graduation.

When separately analyzing those who graduated on time and those who had delayed graduation (in both cases compared with those who did not graduate at all), the relationship for high BMI, education, and rank remained important predictors of graduating on time. Although stress fracture occurrence during training was not related to overall graduation, it was related to delayed graduation.

All of the statistically significant variables found in the univariate descriptive characteristics were simultaneously used to build a logistic model to predict overall graduation status. A second multivariable model compared those who did not graduate with those who graduated on time and those who graduated late (delayed graduation). The results, shown in Figure 1, adjusted for age, BMI, race/ethnicity, education, and rank, indicate that high levels of self-assessed fitness, working up a sweat during exercise most or all of the time, able to do more than 10 pull-ups, and never using cigarettes were all independently associated with overall graduation from BUD/S training; note that having a stress fracture during

training was not associated with overall graduation. After adjusting for age, BMI, race/ethnicity, education, and rank, only two variables were associated with graduating on time: not having a stress fracture during training and the self-reported ability to do 10 pull-ups prior to training. After adjustment, the factors associated with delayed graduation included having a stress fracture during training, reporting high levels of fitness, and working up a sweat during exercise prior to training. Occurrence of a stress fracture during training was associated with lower rates of graduating on time and higher rates of delayed graduation, but not with the overall graduation rate.

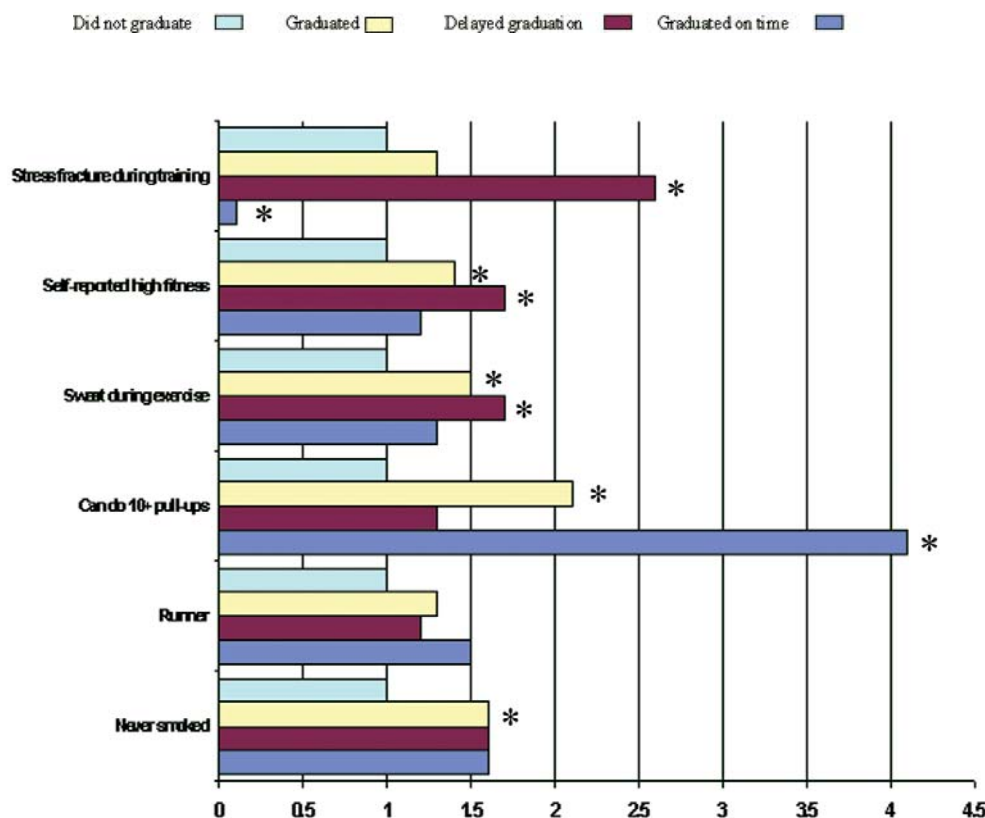
Fig. 1. Multiple logistic regression model for selected characteristics by graduation status.

Odds ratios (X-axis) are adjusted for age, BMI, race/ethnicity, education, and rank plus all other characteristics shown in the figure.

An odds ratio of 1.0 signifies no association between the characteristic and graduation category. An odds ratio of over 1.0 indicates a higher risk while an odds ratio below 1.0 indicates a lower risk.

All measures are self-reported except “stress fracture during training”

* Statistically significant differences from those who did not graduate (the reference group).



DISCUSSION

The U.S. Special Operations Command (USSOCOM), Biomedical Initiatives Steering Committee (BISC) commissioned this study to report the magnitude of the stress fracture problem during BUD/S training and identify factors related to attrition with special attention to stress fractures.

Stress Fracture

During the BUD/S training program, 72 of the 1046 trainees (6.9 %) incurred at least one stress fracture or stress reaction. This is slightly lower than reported in other studies of BUD/S trainees.³ The study sample size (n = 1046) was larger than any prospective study found in the medical scientific literature for U.S. Special Operations Forces personnel and one of the strengths of the present study is that the follow-up of stress fracture was confirmed using a strict protocol.⁷ Stress fracture definition in the scientific literature is inconsistent, so it is difficult to compare other studies without verifying diagnostic criteria.^{7,8} However, in the present study, inconclusive plain radiographs were usually followed up with a technetium bone scan or MRI to confirm diagnoses. Any positive radiographic test without clinical symptoms

could represent a prevalent injury and were not defined as an incident stress fracture, and because radiographic diagnoses are subject to errors, primarily false negative,⁹ they were not included as a stress fracture case. In this investigation, radiologists at NMCS D performed the diagnostic reading and did not rely on routine orthopedic consultation. The literature shows no evidence of significant misinterpretations in the reading comparing these two medical specialties,¹⁰ and the decision for consultation is set by institutional policy and usually is focused on health care cost savings.¹¹

The only variables that identify trainees

at risk for stress fracture during training are entry-level low BMI and current shin pain. It is not known if their current shin pain was a stress reaction and, therefore, a precursor for stress fracture. It usually takes two to three weeks of unaccustomed activity to cause a stress fracture, and current symptoms of shin pain could mean periosteal or endosteal reaction already occurring prior to the start of INDOC.⁷ Eliminating the 54 subjects with shin pain at entry, the numerator would decrease from 72 to 60 (subtracting 12 who had a stress fracture) and the denominator would go from 1046 to 992 (subtracting 54) for an adjusted stress fracture incidence of 6.1%. Eleven (20.4%) of the 54 trainees who reported experiencing shin pain a lot or most of the time after exercising were among the graduates, slightly lower than the overall 26% graduation rate. It is important to note that had NAVSPECWARCEN eliminated the 54 trainees with shin pain at the beginning of training, they would have eliminated 11 BUD/S graduates – 11 potential SEALs.

Attrition

Two categories of graduation were created: those who graduated within 263 days of training (on time graduation) and those graduated after 263 days of training (delayed graduation). BUD/S trainees typically report to NAVSPECWARCEN for forming (muster) up to eight weeks before official training. Trainees undergo entry-level physical training during forming and INDOC, a five-week indoctrination program mandated by the Chief of Naval Education and Training (CNET). Formal BUD/S training is divided into three distinct phases of eight to nine weeks duration: First Phase includes the notorious “Hell Week”; Second Phase is described as Open Circuit and Closed Circuit training; Third Phase occurs mostly off-site NAVSPECWARCEN and involves land warfare, reconnaissance, shooting, and specialized training. In summary, the total time on board including forming and INDOC is approximately 263 days.

Only 26% of U.S. Navy BUD/S trainees in classes 241 to 249 graduated from the training program. Most of the group who did not graduate (83%) dropped the program voluntarily. Several factors were identified that were associated with successful completion of the program. The factors included high BMI, having at least some college (compared with high school graduates), self-reporting excellent or very good fitness, working up a sweat most or all of the time during exercise, being able to do 10 pull-

ups, and never using tobacco. All of these variables were collected prior to the training program and could be useful as part of the picture in assessing which trainees might succeed in the program. Most of these variables are self-reported and generally describe personal health traits that suggest a strong motivation to be active and healthy.

The most interesting finding for attrition is the differences between those who graduate on time, graduate late, and do not graduate at all. For example, our results suggest that successful trainees who go through the program without setbacks are different from those who do not graduate in that they do not incur a stress fracture during training and they enter training with the ability to do at least 10 pull-ups. However, those who graduate late (after 263 days) are more likely to have incurred a stress fracture and report high fitness levels and exercise levels, but (as a group) are not different than those who do not graduate in their stated ability to do at least 10 pull-ups. As expected, stress fractures during training are strongly associated with delayed graduation; however, they are not associated with overall graduation rates, and represent only a minor portion of those who attrite. The trainee who ultimately graduates may have been exercising hard to get into shape and thus may have increased his risk for a stress fracture. However, even controlling for stress fracture occurrence, the inability to do at least 10 pull-ups may be a marker for some other physical condition that may delay graduation.

Limitations

During the data collection period, a BUD/S training program procedural change was implemented: the documentation of PFT scores was changed to specify pass or fail rather than recording the actual time or number, so this measure could not be used in the analysis. We would have preferred to collect the swim and run times, and number of sit-ups, pull-ups, and push-ups, and analyze continuous data rather than a dichotomous pass or fail, because interpreting continuous data can help establish changes in physical test cut-points.

The BUD/S medical staff is trained to identify potential stress fractures early and reduce the impact on attrition. Their amelioration strategy is to treat diagnosed stress reactions before they develop into a stress fracture. Doing so can decrease the number of diagnosed stress fractures and result in fewer days out of training. The general consensus

among the BUD/S medical staff is that a stress reaction would probably have developed into a stress fracture had this secondary prevention strategy not been used. For this reason the investigators pooled stress reaction and stress fracture into a single injury category. This comment is only a limitation when comparing rates from previous studies; otherwise, it should be considered a strength of medical care. The BUD/S medical staff has tuned in to the signs and symptoms of stress fractures and treats all stress reactions immediately, before radiological confirmation, as if they are diagnosed as a stress fracture.

Directions for Future Studies

Future research could analyze training day exposures as a way to explore the timing of these injuries and facilitate comparison within and between military and civilian populations. Person-time injury incidence rates, such as the rate of injury per 100 person-months of exposure, allow for comparison between study populations who have different exposure times at risk. In contrast, cumulative incidence of musculoskeletal injuries in military populations have been reported extensively in the literature, however, these studies are difficult to compare within and between populations because they have used varied definitions to determine injuries and population at risk. Another manuscript using the data from this study could present person-time injury incidence rates and compare them with other military populations^{1,4,12,13} to gather further insight into the magnitude of the stress fracture problem during BUD/S training. It might reveal that taking into account the duration of BUD/S training, their person-time stress fracture rate is equal to or less than that of the other services.

CONCLUSIONS

This study found that shin pain and low BMI are both risk factors for stress fracture during BUD/S training, suggesting that attention to shin pain and body weight issues prior to the start of training could be important in reducing the number of stress fractures. Evaluating person-time incidence rates and the timing (the week in training) of the stress fracture occurrence could also provide insight as to when in the program these are most likely to occur; prevention and intervention strategies should follow evidence-based results.

Having good exercise behaviors prior to training, especially the ability to do 10 or more pull-ups,

may be the best indicators for completing the BUD/S training. Although many self-report exercise and health habits were related to graduation, attrition is complicated by the long program and lack of specific information on the reasons for voluntary drops. Collecting standardized information at exit may lead to better understanding of the process involved in attrition.

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Post-Exposure Prophylaxis for HIV in the SOF Environment

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ABSTRACT

Special Operations Forces (SOF), both medical and non-medical, have the opportunity to operate in isolated areas while being exposed to a variety of infectious agents. Although the incidence of human immunodeficiency virus (HIV) in the United States military deployed population can be assumed to be nearly zero, experience has shown that our forces are often exposed to populations where the HIV rates can be extremely high or unknown and personal protective measures may not be available. Compliance with the Centers for Disease Control and Prevention guidelines for HIV post-exposure prophylaxis (PEP) is the policy in place for most if not all major military commands. These recommendations are predicated on the fact that the highly active antiretroviral therapy is available in the proposed time frame. Using the Air Force as an example, this article looks at availability of anti-HIV medications on allowance standards. Of a possible 133 allowance standards listed with the United States Air Force Medical Logistics Organization (AFMLO), only 15 (11.27%) contain one or more of the available antiretroviral medications at the time of review. Although these highly active antiretroviral therapy (HAART) medications are not very heat stable and may lose effectiveness when exposed to temperature extremes, it is possible for an individual medic to carry enough medicine to comply with CDC recommendations without significant increase in “weight and cube” packing allowances.

OBJECTIVES:

1. Identify ways in which deployed military forces might be exposed to HIV.
2. Recognize significant exposure and identify need for HIV post-exposure prophylaxis based on CDC guidelines.
3. Identify acceptable drug regimens for HIV post exposure prophylaxis.

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The authors have indicated that, within the past two years, they have had no significant financial relationship with a commercial entity whose products/services are related to their topic subject matter.

INTRODUCTION

Special Operations Forces (SOF), both medical and non-medical, have the unique opportunity to operate in environments where chance of exposure to a variety of infectious agents while being geographically separated from conventional, first-world medical resources is a real occupational hazard. The need for protection against endemic infections in these areas is well-recognized. Malaria is one example of a disease on which the military medical community

places significant emphasis towards prevention, prophylaxis, and treatment. Similar importance has been placed on some blood-borne pathogens as evident in the approach to viral hepatitis. By ensuring immunization against hepatitis B, troops are given the best defense against one blood-borne pathogen, and currently no specific recommendations for post-exposure prophylaxis of hepatitis C exist. Yet for the deployed member, not as much emphasis has been

placed on protection after occupational exposure to the human immunodeficiency virus (HIV). Although the incidence of HIV in the United States military deployed population can be assumed to be nearly zero, experience has shown that our forces are often exposed to populations where the HIV rates can be extremely high or unknown. Can we as a deployable military medical community do a better job of protecting personnel (both medical and non-medical) in the event of occupational exposure to HIV? The purpose of this article is to look specifically at the scope of this problem and determine the need for occupational HIV prophylaxis. The current recommendations from the Centers for Disease Control and Prevention (CDC) are presented and the current availability of anti-HIV medications on deployable United States Air Force allowance standards is reviewed. Finally, recommendations are made regarding deployable HIV post-exposure prophylaxis (PEP).

RISK ASSESSMENT

The risk of occupational exposure to HIV to deployed American troops and the transmission rates after exposure are difficult to ascertain as there is a large distribution of risk depending upon the mission, geographic area, interaction with the local populace, and HIV prevalence within that population. Based on studies of occupational exposures to HIV in health care workers in the United States, the average risk of HIV after percutaneous exposure to HIV infected blood is estimated to be 0.3% and approximately 0.09% after mucous membrane exposure.^{1,2} However, a more specific risk assessment must be made at the unit level based on mission details and the area of responsibility. Transmission rates will be higher in particular areas of the world where SOF may be tasked to deploy. In certain areas of Sub-Saharan Africa and Southeast Asia, for example, the HIV rates can approach 40%.³ If anti-HIV medications are not available to the indigenous population, viral loads are likely to be higher, which can significantly increase transmission rates after exposure. Even when operating in areas where the incidence of HIV in the indigenous population is thought to be low, the chance of exposure remains.

There are many medical and non-medical situations in which an individual troop could be exposed to HIV. SOF medical personnel may be tasked with anything from routine medical care to surgical intervention of coalition allies, host-nation military and civilians, enemy forces, detainees, prisoners of war,

and third-country nationals. Each of these populations may have a different prevalence of HIV. Personal protective measures, like gloves, gowns, and masks, which are standard for stateside medical facilities, may not be available in the SOF environment. Determination of the source's HIV status will rarely be possible in a timely fashion. In addition, non-medical personnel are at risk of exposure to blood-borne pathogens when exposed to individuals with open wounds. HIV has been transmitted after exposures on open skin or mucous membranes. Examples of forces at risk for non-medical exposure include security forces tasked with control of detainees, anyone who comes across dead or wounded, and combatants who fight at close range or hand-to-hand. When all these possibilities are taken into account, it amounts to a very real threat. Although there has not yet been a reported case of occupational HIV transmission in a deployed setting, the possibility remains and warrants consideration.

CENTERS FOR DISEASE CONTROL AND PREVENTION RECOMMENDATIONS

Compliance with the CDC's recommendations for post-exposure prophylaxis for HIV is the current policy for most, if not all, major commands and medical centers. The CDC definition of "exposure" is as follows:

*"...an exposure requiring consideration of PEP is defined as a percutaneous injury (e.g., a needlestick or cut with a sharp object), contact of mucous membrane or non-intact skin (e.g., when the exposed skin is chapped, abraded, or afflicted with dermatitis), or contact with intact skin when the duration of contact is prolonged (i.e., several minutes or more) or involves an extensive area, with blood, tissue, or other body fluids. Body fluids include a) semen, vaginal secretions, or other body fluids contaminated with visible blood that have been implicated in the transmission of HIV infection; and b) cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids, which have an undetermined risk for transmitting HIV. In addition, any direct contact (i.e., without barrier protection) to concentrated HIV in a research laboratory or production facility is considered an 'exposure' that requires clinical evaluation and consideration of the need for PEP."*⁴

Furthermore, the CDC states that an occupational exposure is "...considered an urgent medical concern requiring timely administration or PEP. Established protocols must facilitate access to the

prophylactic drugs.”⁴ Not only must PEP be provided, but they also recommend medical counseling be available and attempts be made to determine the HIV status of the source and the exposed.

POST-EXPOSURE

PROPHYLAXIS RECOMMENDATIONS

The standard for HIV PEP is based on the idea that PEP can prevent seroconversion. Although prospective studies are lacking due to low numbers, statistical power, and ethical concerns, strong evidence does exist to show significant risk reduction. In one retrospective study, Cardo, et al., showed that PEP could reduce the odds of HIV infection after occupational exposure to HIV-infected blood by 81%.⁵

Numerous medications are available for HIV post-exposure prophylaxis. The regimen recommended by the United States Public Health Service (USPHS) for most exposures consists of two anti-retroviral medicines (both reverse transcriptase inhibitors) for four weeks. There are three accepted two-drug combinations to consider: (1) zidovudine (AZT) and lamivudine (3TC) or emtricitabine (FTC); (2) stavudine (d4T) and 3TC or FTC; or (3) tenofovir (TDF) and 3TC or FTC. The two-drug regimen may be expanded with a third or fourth drug (protease inhibitors) for HIV exposures with an increased risk of transmission or if there is concern of resistance.⁶ The preferred drug for the expanded PEP regimen is the combination of two protease inhibitors, lopinavir/ritonavir (LPV/RTV). Other acceptable protease inhibitors include atazanavir, fosamprenavir, RTV-boosted IDV, RTV-boosted SQV, or nelfinavir (NFV).⁶ The CDC considers compliance with these recommendations to be highly active anti-retroviral therapy (HAART).

Table 1. Anti-retrovirals with associated side effects and toxicities⁶

*Reproduced from the U.S. Public Health Service Guidelines

Class and agent	Side effect and toxicity
Nucleoside reverse transcriptase inhibitors (NRTI)	Class warning: all NRTIs have the potential to cause lactic acidosis with hepatic steatosis
Zidovudine (Retrovir, ZDV, AZT)	Anemia, neutropenia, nausea, headache, insomnia, muscle pain, weakness
Lamivudine (Epivir, 3TC)	Abdominal pain, nausea, diarrhea, rash, pancreatitis
Stavudine (Zerit, d4T)	Peripheral neuropathy, headache, diarrhea, nausea, insomnia, anorexia, pancreatitis, increased liver function tests (LFTs), anemia, neutropenia
Diadanosine (Videx, ddI)	Pancreatitis, lactic acidosis, neuropathy, diarrhea, abdominal pain, nausea
Emtricitabine (Emtriva, FTC)	Headache, nausea, vomiting, diarrhea, and rash. Skin discoloration (mild hyperpigmentation on palms and soles), primarily among nonwhites
Nucleotide analogue reverse transcriptase inhibitor (NtRTI)	Class warning: all NRTIs have the potential to cause lactic acidosis with hepatic steatosis
Tenofovir (Viread, TDF)	Nausea, vomiting, flatulence, and headache
Non-nucleoside Reverse Transcriptase Inhibitors (NNRTIs)	
Efavirenz (Sustiva, EFV)	Rash (including Stevens-Johnson syndrome), insomnia, somnolence, dizziness, trouble concentrating, and abnormal dreaming, and teratogenicity
Protease Inhibitors (PIs)	
Indinavir (Crixivan, IDV)	Nausea, abdominal pain, nephro-lithiasis, indirect hyperbilirubinemia
Nelfinavir (Viracept, NFV)	Diarrhea, nausea, abdominal pain, weakness, rash
Ritonavir (Norvir, RTV)	Weakness, diarrhea, nausea, circumoral paresthesia, taste alteration, increased cholesterol and triglycerides
Saquinavir (Fortovase, SQV)	Diarrhea, abdominal pain, nausea, hyperglycemia, increased LFTs
Fosamprenavir (Lexiva, FOS-APV)	Nausea, diarrhea, rash, circumoral paresthesia, taste alteration, and depression
Atazanavir (Reyataz, ATV)	Nausea, headache, rash, abdominal pain, diarrhea, vomiting, and indirect hyperbilirubinemia
Lopinavir/Ritonavir (Kaletra)	Diarrhea, fatigue, headache, nausea, increased cholesterol and triglycerides
Fusion inhibitor	
Enfuvirtide (Fuzeon, T-20)	Local injection site reactions, bacterial pneumonia, insomnia, depression, peripheral neuropathy, and cough

Each medication used for HIV PEP carries with it a significant risk of adverse effects that cannot be discounted (Table 1). These symptoms must be considered when choosing which drug regimen to follow. The side effects should be minimized or elim-

inated if possible to assure compliance for the full course of treatment. For this reason, the USPHS advocates the availability of supportive medications for symptomatic relief of the anti-HIV medications' adverse effects.

Animal studies have shown that anti-retrovirals are more effective when started soon after exposure.⁶ Because of this, initiation of the regimen must occur as soon as possible – within hours of exposure rather than days. Most stateside hospitals have policies in place that promote compliance. As an example, the 96th Medical Group/Eglin Hospital protocol mandates the administration of post-exposure prophylaxis within one to two hours of the event. For the deployed medic, this means that PEP should be started at the earliest possible echelon of care.

METHODS

Wartime Readiness Materiel (WRM) medical allowance standards are electronically stored at the United States Air Force Medical Logistics Operations Center (AFMLO) at Fort Detrick, Maryland. This office is the central location for approval of medical supplies ordered and distributed to deployed locations for use by United States Air Force personnel. The AFMLO database was searched in March 2005 and reviewed for all medical WRM equipment packages containing any of the FDA-approved post-exposure prophylaxis medications. Those allowance standards containing the recommended medications were therefore considered able to provide the PEP to the exposed individuals.

Secondarily, a review of package inserts for Food and Drug Administration (FDA) approved anti-HIV medications was performed to determine which drugs were most appropriate for deployment with medical personnel, with the intent of selecting the best available options for “downrange” post-exposure prophylaxis. One important aspect to consider when planning medications for any deployment package is the ability of the medication to remain effective after exposure to extremes of temperature. Thus, the primary detail obtained from the inserts was each medication's temperature stability.

RESULTS

ALLOWANCE STANDARDS

Of a possible 133 allowance standards listed with AFMLO, only 15 (11.27%) contain one or more of the available reverse transcriptase inhibitor or protease inhibitor drugs. Most of the packages carrying anti-retrovirals are responsible for patient holding

and transportation or are a dedicated infectious disease response team. At the time of the search, only one Air Force Special Operations Command (AFSOC) Unit Type Code or UTC (Special Operations Critical Care Evacuation Team or SOC-CET) possessed Combivir (lamivudine/zidovudine), which would meet the CDC guidelines for two-drug treatment required of most exposures.

TEMPERATURE STABILITY

When the package inserts for the most common anti-retrovirals were reviewed in terms of storage temperature recommendations (see Table 2), we found a rather limited range. Most of the inserts recommend storage at room temperature with excursions permitted from 15 to 30 degrees Celsius (59 to 86 degrees Fahrenheit). Others require refrigeration which may not be easily obtainable in many field environments.

There are some limitations to this review that should be mentioned. Obviously, the review is limited to the Air Force and does not include all Special Operations medical allowance standards. Perhaps other Services may have more accessibility of these medications for their SOF personnel in their packing lists. Future studies can be done to review the logistics databases for other Services.

It is also possible that some allowance standards were not completed and approved at the time of the search, and therefore were not published on the AFMLO website. For example, AFSOC's Special Operations Surgical Team (SOST) recently added both Combivir and Viracept. The results of the review reflect only the published and approved Air Force equipment packages at the time the review was performed in March 2005.

A second limitation to this study is that it does not take into account other plans a deploying unit may have in place to obtain medications. Deploying teams can sometimes acquisition necessary items from a home station pharmacy prior to departure, though not on the official allowance standard. Anecdotally, deploying physicians have written prescriptions for the selected anti-retrovirals. Plans may be in effect to obtain needed medicines from other preexisting facilities in the area of operations. This practice, however, can be dangerous. Co-existing conventional U.S. and coalition medical facilities overseas may lack adequate supplies to be distributed. Any reliance on the host nation to provide the appropriate medications will require prior coordination as the government may lack resources, finances, understanding, or even

Table 2. Anti-retroviral Medications and Temperature Storage Ranges⁷⁻²⁸

Drug Name	Mechanism of Action	Temp. Range
Agenerase (amprenavir)	Protease Inhibitor	Store at 25C (77F)
Combivir (lamivudine/zidovudine)	Reverse Transcriptase Inhibitor	Store at 2-30C (36-86F)
Crixivan (indinavir sulfate)	Protease Inhibitor	Store at 15-30C (59-86F)
Epivir (lamivudine)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Epzicom (abacavir sulfate/lamivudine)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Fuzeon (enfuvirtide, T-20)	Fusion Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Invirase (saquinavir mesylate)	Protease Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Kaletra (lopinavir/ritonavir)	Protease Inhibitor	Store at 2-8C (36-46F)
		Up to 25C (77F) if used in 2 months
Emtriva (emtricitabine)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Lexiva (fosamprenavir calcium)	Protease Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Norvir (ritonavir)	Protease Inhibitor	Store at 2-8C (36-46F)
		Up to 25C (77F) if used in 30 days
Rescriptor (delavirdine mesylate)	Reverse Transcriptase Inhibitor	Store at 20-25C (68-77F)
Retrovir (zidovudine)	Reverse Transcriptase Inhibitor	Store at 15-25C (59-77F)
Reyataz (atazanavir sulfate)	Protease Inhibitor	Store at 15-30C (59-86F)
Sustiva (efavirenz)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Trizivir (abacavir sulfate/lamivudine/zidovudine)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Videx EZ (didanosine)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Viread (Tenofovir, TDF)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Viracept (nelfinavir mesylate)	Protease Inhibitor	Store at 15-30C (59-86F)
Viramune (nevirapine)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Zenit (stavudine)	Reverse Transcriptase Inhibitor	Store at 25C (77F)
		Excursions permitted 15-30C (59-86F)
Ziagen (abacavir sulfate)	Reverse Transcriptase Inhibitor	Store at 20-25C (68-77F)

acceptance of the problem.

DISCUSSION

The United States Air Force Medical System (AFMS) remains dedicated to providing first world medical care to deployed military members and our coalition partners regardless of the actual location. Compliance with the CDC's guidelines, when feasible, is within this goal set. Post-exposure prophylaxis for HIV presents a complicated problem. Once the event occurs, there is no substitute for HAART. The CDC recommendations are clear and are generally followed by medical personnel in the United States. A simple statement of compliance with CDC Guidelines is inadequate guidance to the far forward medic, when the medications to follow that guidance may not be available for extended periods of time.

At the same time, medical personnel are often not organic to the operational units themselves and are seemingly an afterthought in the mission planning phase, limiting time and space in prepara-

tion for deployment. Understanding "weight and cube" restrictions imposed on medical assets, SOF medical personnel must assess risks, plan and pack accordingly, and improvise when necessary. Pre-positioning PEP medicines in the area of responsibility is one option to avoid adding to an already full allowance standard. However, given the limited temperature range listed for these drugs, it may be more appropriate to have them stored with the equipment to be "hand-carried" to the field. The addition of a limited amount of HIV PEP medications would not be large or heavy enough to significantly change any allowance standard or packing list.

Unique circumstances present themselves to the far forward medical personnel. As a rule, spe-

cial operators deal with contingencies, not emergencies. Medics must have planned for these contingencies and have options to deal with them. The ability to provide post-exposure prophylaxis in forward locations affords the task force commander options as well. With medication availability, evacuation, if necessary, can occur at a convenient time with regards to transportation restrictions. This may translate into less adverse effects on the mission and less operational risk.

While intended exclusively for occupational PEP, it is also conceivable that these medications may have an additional application in the event of non-occupational post-exposure prophylaxis (nPEP). For example, the same anti-HIV medicines used for occupational PEP are commonly offered and employed for victims of sexual assault.^{29,30} Furthermore, the medications may offer protection after potential HIV exposure due to unsafe sexual practices.^{29,30} In these circumstances it is especially important to remember that nPEP does not guarantee protection from sero-

conversion, and risk of seroconversion must always be weighed against the potentially debilitating adverse effects from the treatment itself.

RECOMMENDATIONS

The authors recommend providing those medications necessary to comply with the CDC's PEP plan, including at least one twenty-eight day supply of the three-drug regimen for those at highest risk (surgical and emergency medical personnel, paramedics, etc.). Those at lower risk (sick call, etc.) should at the very least have one twenty-eight day supply of the two-drug regimen within the allowance standard. Lower risk populations may also need the three-drug regimen if deploying into areas known to have a high prevalence of HIV or high resistance rates, especially when interaction with the local population is a possibility. In special circumstances (previous adverse reaction or known allergy) the individual medic should be prescribed and hand-carry the appropriate alternative drug. In all cases an adequate supply of anti-emetics and anti-motility agents should be available. While logistical limitations exist, whenever possible, these PEP care packages should be allocated and hand carried by each individual medic deployed to a far forward operating location. Additional supplies may be needed for responses to occupational exposures by non-medical personnel. Employing this package does not guarantee safety or prevention, but affords the exposed individual the best chance of not undergoing seroconversion.

CONCLUSION

Commonsense dictates that it is not economically or logistically feasible for every unit to carry HIV post-exposure prophylaxis medication regimens for all personnel in the theater, but some cache of the drugs must be available when the need arises. In order to reach the standards of first-world medicine in the third world, we must bring certain medications to the deployed locations. With the morbidity and mortality associated with HIV and AIDS, America's fighting forces deserve the best chance available to prevent seroconversion. This should be a goal of those with the privilege to care for them.



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Trauma Care Using Explosive Ordinance Disposal Radiographic Capabilities

Ronald J. Place, MD

ABSTRACT

Introduction: In austere medical environments, supporting medical assets are often unavailable. For Operation ENDURING FREEDOM, large numbers of special operations assets deployed with relatively small numbers of supporting units. This article describes the use of an Explosive Ordinance Disposal (EOD) radiographic device for preoperative assessment of a gunshot wound to the foot after a direct action. **Case report:** The patient was a 31-year-old male who sustained a high-velocity through-and-through gunshot wound to his left foot. Medical radiographic capability did not exist within the area of operation. In an attempt to have preoperative radiographs, the forward surgical team (FST) utilized an EOD radiographic unit. This unit provided two satisfactory orthogonal radiographic views that demonstrated comminuted, minimally displaced fractures of the cuboid and navicular bones of the left foot with no radio-opaque foreign bodies or other abnormalities. **Conclusion:** EOD radiographic devices can give physicians reasonable preoperative information in urgent situations while deployed in austere medical environments.

Disclaimer:

The opinions expressed in this manuscript are those of the author and do not necessarily represent the official policy of the Department of the Army, the Department of Defense, or the United States Government.

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INTRODUCTION

Deployed military surgeons often face situations where medical decisions must be made with less information than would be available in fixed hospital facilities or civilian practice. In the special operations environment, where units often deploy with minimal support elements, this situation can occur more frequently. Army FSTs are assets used for far forward resuscitative surgical care in support of maneuver brigades or special operations forces. According to Army doctrine, FSTs co-locate with other support services including basic radiographic and laboratory services. In the first stages of Operation ENDURING FREEDOM (OEF), relatively large numbers of special operations forces deployed with smaller numbers of conventional forces. In this situation, the FST deployed to Central Asia without the corresponding support elements. In an effort to improve the preop-

erative diagnostic evaluation following a high-velocity gunshot wound to the foot of a special operations Soldier, the FST utilized a radiographic device that is normally employed by the explosive ordinance disposal (EOD) technicians for viewing inside containers.

CASE REPORT

The casualty was a 31-year-old male involved in a special operations small unit raid that resulted in a high-velocity through-and-through bullet wound to his left foot. Initial treatment at the scene included a pressure dressing. He was air-evacuated to Kandahar Airfield for treatment at the FST. No pre-operative medical radiographic capability existed within the area of operation. Prior to removal of his bandages, the FST consulted with an EOD radiographic unit for use of their imaging device (XR150, Golden Engineering,

Centerville, IN). The device was set at count 2 (6 pulses) for a total of 6mrem per exposure. Anterior-posterior (Figure 1) and lateral radiographs (Figure 2) were performed. These films identified comminuted, minimally displaced fractures of the cuboid and navicular



Figure 1. A/P radiograph after high velocity gunshot wound through the left mid-foot.



Figure 2. Lateral radiograph after high velocity gunshot wound through the left mid-foot.

bones of the left foot along with soft tissue injury. The radiographs showed no radio-opaque foreign bodies or injuries to other bony structures. After evaluation and trauma resuscitation, the patient received intravenous antibiotics prior to preparation for surgery. On the operating table he received an incision, irrigation, debridement, and drainage of his wounds without wound closure. Intra-operatively the surgeons found additional soft-tissue injuries that included lacerations to the peroneus longus, flexor digitorum longus, and flexor hallucis longus tendons. After the surgical team packed his wounds open, the patient suffered no post-operative complications. After recovery, Air Force tactical and strategic medical evacuation assests airlifted him through standard routes to the United States (U.S.) for further evaluation and definitive treatment. A surgical team in the U.S. performed delayed primary closure on post-injury day 15. Three months post-injury, he had complete wound closure with no evidence of osteomyelitis.

DISCUSSION

U.S. Army FSTs, and similarly small but mobile surgical capabilities fielded by other services, often deploy in areas that do not have the medical support services that surgeons are accustomed to in U.S. hospitals or mature combat theaters. Due to the special operations focus of some military operations, these services are often not included in the initial personnel and equipment packages. In these cases, military surgeons must use the resources available in their vicinity to maximize the medical care for injured Soldiers.

International law states that military bullets must be fully jacketed and non-expanding. Jacketed bullets maintain their integrity as they pass through tissues and cause less cavitation than expanding bullets.¹ The projectiles from most low-velocity (civilian) weapons average 1000 to 2000 feet per second while high-velocity (military) weapon projectiles average over 2000 feet per second. Most military ammunition velocities range from 2400 to 2900 feet per second and the M-16 rifle projectile velocities at 3250 feet per second.² Using experimental animals, Harvey et al., showed that impact of the jacketed bullet produces pressure pulses as high as 100 atmospheres, creating an extremely high negative pressure at the level of entry.³ Anything on the skin of the wounded Soldier potentially can be sucked into a high-velocity gunshot wound to create the opportunity for significant infection. Barium sulfate placed on the skin of an animal is "vacuumed" into the gunshot wound when viewed with fluoroscopy.⁴

The initial management of war wounds involving bones or joints at the forward surgical sites focuses on wound debridement with wide exposure to facilitate the complete removal of foreign material, devitalized muscle, and other non-viable tissue.^{5,6} Forward surgeons should remove smaller devitalized fragments of loose bone while leaving in place larger, viable fragments. Furthermore, such surgery should not attempt early nerve and tendon repairs and should delay closure.⁷ As fascial planes provide for the dissipation of explosive forces behind a high-velocity missile, muscles located adjacent to these planes may also sustain severe damage.¹ Consequently forward surgeons should examine them and debride any injured and devitalized muscle. For all high-velocity gunshot wounds the surgical team should use copious irrigation and apply parenteral antibiotics along with tetanus immune globu-

lin (TIG) and tetanus toxoid for those patients without prior immunization. Conducting follow-up surgical irrigation and debridement every 24 to 48 hours until the wound is clean helps prevent infection, promote healing, and eventually restore function. Delaying primary closure until the time when the wound becomes clean can yield the potential benefits of shortened hospital stays, fewer scar contractures or stiff joints, and reduced risk of bacterial colonization.⁸

Published guidance for gunshot wounds to the foot is sparse. The largest U.S. series retrospectively evaluated 101 civilian trauma patients.² Of those, only three suffered high-velocity gunshot wounds. Despite initial aggressive debridement and prophylactic antibiotics, all three developed osteomyelitis compared to 7% for low-velocity foot wounds. The largest international series comes from the battlefields of the former Yugoslavia. Missile injuries to the foot occurred in 250 patients, 77 of whom had military firearm injuries.⁹ Although this series did not examine complications by mechanism of injury, 26% of these patients had significant early or late complications, most of which were infectious. While the number of patients with high-velocity rifle injuries was very small, this experience reinforces the notion that surgeons should treat foot wounds with multiple aggressive debridements and a therapeutic course of antibiotics.

While radiographs are not a requirement prior to surgery for gunshot wounds of the extremities, they provide an ability to evaluate the bony structures for normal anatomy and fractures -- as well as to locate foreign bodies and remove them during primary debridement. The XR150 films do not provide the bony detail most surgeons are accustomed to seeing in civilian practice nor are they adequate to determine the presence or absence of small fractures.

Finally, it is much more difficult to determine radiation exposure to patients with this machine.

These are some of the reasons that the company does not recommend the device be used for medical radiographs. However, the films obtained are suitable to determine metallic or bony foreign bodies if they are distant from the wound site prior to initial debridement, and to identify displaced or distracted fractures. The EOD technician has significant training in the safety and use of the device, and can reliably provide films of good quality.

CONCLUSION

Military surgeons must be flexible and adapt to services available in their area of operations. The use of the EOD XR150 directed the debridement for this patient and may be useful in emergencies when standard extremity radiographic services are unavailable.

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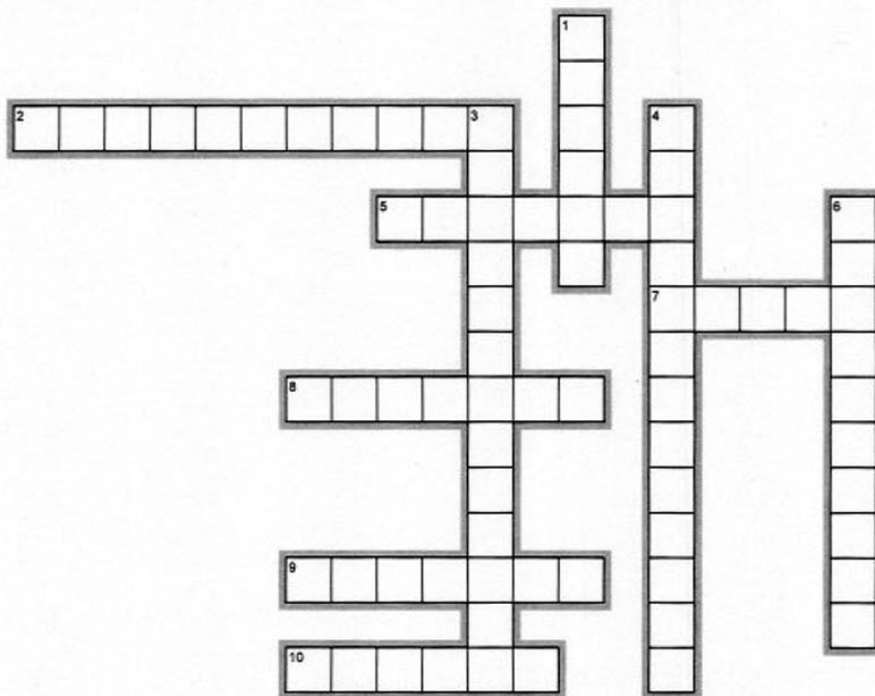


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SOCOM Medics, Corpsmen, and PJs will be granted **1.2** CME for the two combined articles.

1. Walking Donor Transfusion in a Far Forward Environment Crossword Puzzle

Created by Maj Michelle DuGuay with EclipseCrossword — www.eclipsecrossword.com



Walking Donor Transfusion in a Far Forward Environment

ACROSS

2. He is responsible for the discovery of major blood types.
5. Walking donor transfusions are currently a more viable option to the military provider in _____ conditions with limited medical supplies and evacuation assets.
7. A Glasgow Coma Score of _____ or less is an indication for oral-tracheal intubation.
8. _____ donor transfusion is a consideration when a patient remains unstable after crystalloid administration, evacuation time is prohibitive, and it is clear that the patient will die if not transfused immediately.
9. The preservatives acid-citrate-dextrose (ACD), citrate-phosphate-dextrose (CPD) and citrate-phosphate-double-dextrose-adenine (CP2D-A) may bind _____.
10. Research is currently underway on non-blood oxygen carrying fluids from free hemoglobin _____ blood.

DOWN

1. The banked red blood cell becomes relatively deficient in 2,3 diphosphoglycerate (2,3 DPG) and adenine triphosphate (ATP) which may change the red cell's ability to carry _____.
3. _____ with whole blood near the point of injury, after proper hemostasis can save lives.
4. The key to successful utilization of this technique is _____ planning.
6. _____ reactions have prompted research into non-cellular oxygen carrying liquids that may be transported and stored at ambient temperatures, cause no recipient immune response, require no recipient replenishment of 2,3 DPG or ATP, and are cost-effective for widespread use.

CONTINUING MEDICAL EDUCATION TEST



2. Post-Exposure Prophylaxis for HIV in the SOF Environment Test



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SOCOM Medics, Corpsmen, and PJs will be granted **1.2 CME** for the two combined articles.

1. Policies regarding HIV post-exposure prophylaxis are based on who's guidelines?
 - a. WHO
 - b. CDC
 - c. Your PCM
 - d. Secretary of Defense
2. Risk of transmission of HIV to health care workers in the U.S. is estimated to be ____% after percutaneous exposure and ____% after mucous membrane exposure.
 - a. 0.9, 0.03
 - b. 0.03, 0.9
 - c. 0.09, 0.3
 - d. 0.3, 0.09
3. In certain areas of Sub-Saharan Africa and Southeast Asia, the HIV rates can approach
 - a. 40%
 - b. 30%
 - c. 20%
 - d. 10%
4. Which of the following is/are situations in which an individual troop could be exposed to HIV?
 - a. Medical personnel caring for host-nation casualty.
 - b. Non-medical personnel tasked with control of detainees.
 - c. Non-medical personnel who fight at close range or hand-to-hand.
 - d. All of the above.
5. Studies have shown that HIV post-exposure prophylaxis can reduce the risk of seroconversion by approximately
 - a. 50%
 - b. 60%
 - c. 70%
 - d. 80%

6. Accepted two-drug combinations for HIV post-exposure prophylaxis recommended by the USPHS include:
 - a. AZT and 3TC
 - b. INH and rifampin
 - c. acyclovir and AZT
 - d. albuterol and atrovent
7. If a third drug is added to the HIV post-exposure prophylaxis regimen, accepted medications include:
 - a. ibuprofen or acetaminophen
 - b. penicillin or azithromycin
 - c. indinavir or nelfinavir
 - d. promethazine or diphenhydramine
8. Side effects from anti-HIV medications
 - a. need not be considered when selecting regimen.
 - b. can be debilitating and should be eliminated or minimized.
 - c. will always make the person taking the medication unfit for duty.
 - d. are similar to most over-the-counter medications.
9. HIV post-exposure prophylaxis should be started
 - a. within hours rather than days.
 - b. within days rather than weeks.
 - c. within minutes rather than hours.
 - d. within the first month after exposure.
10. In regards to temperature stability of most HIV meds which statement is most correct:
 - a. Stable at any temperature.
 - b. Stable only when refrigerated.
 - c. Stable only at room temperature.
 - d. Stable at room temperature, but excursions permitted at higher temperatures.

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1. *Walking Donor Transfusion in a Far Forward Environment* -- Crossword Puzzle-**Page 14**

2. *Post-Exposure Prophylaxis for HIV in the SOF Environment* -- Test -**Page 41**

1. A. B. C. D.

6. A. B. C. D.

2. A. B. C. D.

7. A. B. C. D.

3. A. B. C. D.

8. A. B. C. D.

4. A. B. C. D.

9. A. B. C. D.

5. A. B. C. D.

10. A. B. C. D.

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ABSTRACTS FROM CURRENT LITERATURE

Use of a Hemorrhage Simulator to Train Military Medics

Military Medicine. Volume 170, Number 11, November 2005, pp. 921-925(5)

Mabry, Robert L.

Abstract

Background: The leading cause of preventable battlefield death is extremity hemorrhage. This study examines how current first aid training for the management of severe extremity hemorrhage can be improved by using a patient simulator. **Methods:** This was a prospective trial involving two cohorts of U.S. Army combat medic trainees. The control group received the standard first aid training for bleeding, including lectures and practical exercises. The study group received the same lectures but was exposed to a hemorrhage simulator during the practical exercises. Both groups were then evaluated during a field exercise seven weeks later. **Results:** The study group showed a statistically significant improvement in the time it took to stop severe extremity hemorrhage in a simulated patient. **Conclusion:** Simple innovations in training may play a significant role in preparing medics (and combatants) to care for injuries they will encounter on the battlefield.

Comparison of Hemorrhage Control Agents Applied to Lethal Extremity Arterial Hemorrhages in Swine

Journal of Trauma: Injury Infection & Critical Care. 59(4):865-875, October 2005.

Acheson, Eric M. MD; Kheirabadi, Bijan S. PhD; Deguzman, Rodolfo MS; Dick, Edward J. Jr. DVM; Holcomb, John B. MD

Abstract

Background: QuikClot powder (QC), chitosan dressing (CD), and fibrin sealant dressing (FSD) are new hemostatic products touted to be more effective in controlling severe extremity bleeding than the current standard gauze dressing. All have been utilized in the Global War on Terrorism. Our objective was to evaluate the hemostatic efficacy of these three products in a model of severe extremity arterial hemorrhage that could not be stopped by standard gauze treatment. **Methods:** A model of severe extremity arterial hemorrhage was developed in swine that was 100% fatal with standard gauze application and manual compression. The Army Field Bandage (AFB) was the standard gauze control. Anesthetized animals (n = 60, 15/group, 37.7 +/- 2.5 kg) were splenectomized and instrumented. A reproducible femoral artery injury was created using a 6mm aortic punch, and free bleeding was allowed for 45 seconds. Each hemostatic agent was applied twice with three-minute compressions. All products were applied on actively bleeding wounds through a pool of blood. Fluid resuscitation was started with the first compression and titrated to a mean pressure of 65mm Hg. Animals were observed for 180 minutes or until death. Endpoints were percent survival, survival time, blood loss, resuscitation volume, wound temperatures, and tissue histology. Data are expressed as mean +/- SD and analyzed by Fisher's exact, logrank, and nonparametric ANOVA tests. **Results:** Baseline physiologic parameters were similar among groups. AFB did not produce hemostasis. QC also showed no hemostatic benefit, and QC treatment markedly increased maximum wound temperatures to an average of 70.8 +/- 4.2[degrees]C (p < 0.001). CD stopped bleeding temporarily in only one animal. There were no survivors in the AFB, QC, or CD groups. CD numerically prolonged survival time (58.9 +/- 21.1 minute) compared with the control (38.4 +/- 24.7 minutes, p = 0.045) but the difference was not significant. FSD reduced bleeding (p < 0.05) and prevented exsanguination in 10/15 (2/3) animals, and resulted in a significantly longer average survival time (p < 0.0001). **Conclusion:** FSD was superior to other currently utilized hemostatic products in controlling lethal arterial hemorrhage in this model of a fatal extremity wound. CD showed some hemostatic benefit. The exothermic reaction of QC was significant and resulted in gross and histologic tissue changes of unknown clinical significance. Controlled human studies with the promising products are required.

Manual Vital Signs Reliably Predict Need for Life-Saving Interventions in Trauma Patients

Journal of Trauma: Injury Infection & Critical Care. 59(4):821-829, October 2005.

Holcomb, John B. MD; Salinas, Jose PhD; McManus, John M. MD, MCR; Miller, Charles C. PhD; Cooke, William H. PhD; Convertino, Victor A. PhD

Abstract

Objective: Various types of diagnostic and monitoring techniques are available in the prehospital environment. It is unclear how increasing complexity of diagnostic equipment improves the ability to predict the need for a life-saving intervention (LSI). In this study, we determined whether the addition of diagnostic equipment improved the predictive power of vital signs and scores obtained only by physical examination. **Methods:** Institutional review board approval was obtained for an analysis of 793 prehospital trauma patient records collected during helicopter transport by Emergency Medical Services personnel. Exclusion of severe head injuries and patients with incomplete data resulted in 381 patients available for analysis. Data sets were classified on the basis of the instrumentation requirements for capturing the given measurements and were defined by three groups: Group 1, vital signs obtained with no equipment (radial, femoral, and carotid pulse character; capillary refill; motor and verbal components of the Glasgow Coma Scale [GCS]); Group 2, Group 1 plus eye component of the GCS and pulse oximetry (Spo2); and Group 3, Group 2 plus fully automated noninvasive blood pressure measurements, heart rate, end-tidal carbon dioxide, and respiratory rate. LSIs performed during transport and in the hospital were recorded. Data were analyzed using a multivariate logistic regression model to determine which vital signs were the best predictors of LSI. **Results:** Radial pulse character and GCS verbal and motor components had the best predictive power for the need of a prehospital LSI in Group 1 (receiver operating characteristic [ROC] curve, 0.97). Radial pulse character together with the eye component of the GCS and the motor component of the GCS provided the best prediction of a need for a prehospital LSI for Group 2 (ROC curve, 0.97). Addition of all supplementary vital signs measured by an automated monitor (Group 3) resulted in an ROC curve of 0.97. Given an abnormal radial pulse character (weak or absent) and abnormal GCS verbal and motor components, the probability of needing an LSI was greater than 88%. **Conclusion:** In this cohort of patients, predicting the need for an LSI could have been achieved from GCS motor and verbal components and radial pulse character without automated monitors. These data show that simple and rapidly acquired manual measurements could be used to effectively triage non-head-injured trauma casualties. Similar results were obtained from manual measurements compared with those recorded from automated medical instrumentation that may be unavailable or difficult to use in the field.

Prolonged Low-Volume Resuscitation with HBOC-201 in a Large-Animal Survival Model 01 Controlled Hemorrhage

Journal of Trauma: Injury Infection & Critical Care. 2005;59:273-283.

Maj Colleen M. Fitzpatrick, MD, Kristen L. Biggs, MD, Maj B. Zane Atkins, MD, LTC Fonzie J. Quance-Fitch, DVM, Patricia S. Dixon, Maj Stephanie A. Savage MD, LtCol Donald H. Jenkins, MD, and Jeffrey D. Kerby, MD, PhD

Abstract

Background: Military guidelines call for two 500ml boluses of Hextend for resuscitation in far-forward environments. This study compared a hemoglobin-based oxygen carrier (HBOC-201; Hemopure) to Hextend when used to treat hemorrhagic shock in situations of delayed definitive care military operations. **Methods:** Yorkshire swine (55-65 kg) were hemorrhaged to a mean arterial blood pressure (MAP) of 30mmHg. Hypotension was maintained for 45 minutes followed by resuscitation with either Hextend (HEX) (n = 8) or HBOC-201 (HBOC) (n = 8). Over eight hours, animals received up to 1,000ml of either fluid in an effort to sustain an MAP of 60 mmHg. At the end of eight hours, HEX animals received 2L of lactated Ringer's solution followed by shed blood. HBOC animals received 4L of Lactated Ringer's solution only. Animals were killed and necropsied on post-procedure day five. Hemodynamic data were collected during shock and resuscitation. Complete blood counts, amylase, lactate, coagulation studies, and renal and liver function were measured throughout the experiment. **Results:** Equivalent volumes were hemorrhaged from each group (HBOC, 44.3 ~ 2.2mL/kg; HEX, 47.4 ~ 3.0mL/kg). The HBOC group achieved the goal MAP (HBOC, 60.0 ~

2.3mmHg; HEX, 46.4 ~ 2.3mmHg; $p < 0.01$) and required less volume during the initial eight hours (HBOC, 12.4 ~ 1.4mL/kg; HEX, 17.3 ~ 0.3mL/kg; $p < 0.01$). The HBOC group had lower SvO₂ (HBOC, 46.3 ~ 2.4%; HEX, 50.7 ~ 2.5%; $p = 0.12$) and cardiac output (HBOC, 5.8 ~ 0.4 L/min; HEX, 7.2 ~ 0.6 L/min; $p = 0.05$), but higher systemic vascular resistance (HBOC, 821.4 ± 110.7 dynes \cdot s \cdot cm⁻⁵; HEX, 489.6 ± 40.6 dynes \cdot s \cdot cm⁻⁵; $p = 0.01$). Base excess, pH, lactate, and urine output did not differ between groups. HEX group survival was 50% (four of eight) versus 88% for the HBOC group (seven of eight). All animals survived the initial eight hours. Animals surviving five days displayed no clinical or laboratory evidence of organ dysfunction in either group. **Conclusion:** HBOC-201 more effectively restored and maintained perfusion pressures with lower volumes, and allowed for improved survival. These data suggest that hemoglobin-based oxygen carriers are superior to the current standard of care for resuscitation in far-forward military operations.

Resuscitation with a Hemoglobin-Based Oxygen Carrier after Traumatic Brain Injury

Journal of Trauma: Injury Infection & Critical Care. 59(3):553-562, September 2005.

King, David R. MD; Cohn, Stephen M. MD, FACS; Proctor, Kenneth G. PhD

Abstract

Background: Traumatic brain injury (TBI) remains an exclusionary criterion in nearly every clinical trial involving hemoglobin-based oxygen carriers (HBOCs) for traumatic hemorrhage. Furthermore, most HBOCs are vasoactive, and use of pressors in the setting of hemorrhagic shock is generally contraindicated. The purpose of this investigation was to test the hypothesis that low-volume resuscitation with a vasoactive HBOC (hemoglobin glutamer-200 [bovine], HBOC-301; Oxyglobin, BioPure, Inc., Cambridge, MA) would improve outcomes after severe TBI and hemorrhagic shock. **Methods:** In Part 1, anesthetized swine received TBI and hemorrhage (30 +/- 2mL/kg, n = 15). After 30 minutes, lactated Ringer's (LR) solution (n = 5), HBOC (n = 5), or 10mL/kg of LR + HBOC (n = 5) was titrated to restore systolic blood pressure to ≥ 100 mm Hg and heart rate (HR) to < 100 beats/min. After 60 minutes, fluid was given to maintain mean arterial pressure (MAP) at ≥ 70 mm Hg and heterologous whole blood (red blood cells [RBCs], 10mL/kg) was transfused for hemoglobin at < 5 g/dL. After 90 minutes, mannitol (MAN, 1g/kg) was given for intracranial pressure ≥ 20 mmHg, LR solution was given to maintain cerebral perfusion pressure at ≥ 70 mm Hg, and RBCs were given for hemoglobin of < 5 g/dL. In Part 2, after similar TBI and resuscitation with either LR + MAN + RBCs (n = 3) or HBOC alone (n = 3), animals underwent attempted weaning, extubation, and monitoring for 72 hours. **Results:** In Part 1, relative to resuscitation with LR + MAN + RBCs, LR + HBOC attenuated intracranial pressure (12 +/- 1mmHg vs. 33 +/- 6mmHg), improved cerebral perfusion pressure in the initial 4 hours (89 +/- 6mmHg vs. 60 +/- 3mmHg), and improved brain tissue PO₂ (34.2 +/- 3.6mmHg vs. 16.1 +/- 1.6mmHg; all $p < 0.05$). Cerebrovascular reactivity and intracranial compliance were improved with LR + HBOC ($p < 0.05$) and fluid requirements were reduced (30 +/- 12 vs. 280 +/- 40mL/kg; $p < 0.05$). Lactate and base excess corrected faster with LR + HBOC despite a 40% reduction in cardiac index. With HBOC alone and LR + HBOC, MAP and HR rapidly corrected and remained normal during observation; however, with HBOC alone, lactate clearance was slower and systemic oxygen extraction was transiently increased. In Part 2, resuscitation with HBOC alone allowed all animals to wean and extubate, whereas none in the LR + MAN + RBCs group was able to wean and extubate. At 72 hours, no HBOC animal had detectible neurologic deficits and all had normal hemodynamics. **Conclusion:** The use of HBOC-301 supplemented by a crystalloid bolus was clearly superior to the standard of care (LR + MAN + RBCs) after TBI. This may represent a new indication for HBOCs. Use of HBOC eliminated the need for RBC transfusions and mannitol. The inherent vasopressor effect of HBOCs, especially when used alone, may misguide initial resuscitation, leading to transient poor global tissue perfusion despite restoration of MAP and HR. This suggests that MAP and HR are inadequate endpoints with HBOC resuscitation. HBOC use alone after TBI permitted early extubation and excellent 72-hour outcomes.



A Prototype for SOF Medic OCONUS Training

Robert Harrington, DMD, MPH

ABSTRACT

The recent 18D medical training program run by the 19th SFG(A) in Nepal can serve as a general model for SOF medic continuing education OCONUS. This intense two-week joint combined exchange training (JCET) program provided unparalleled access to medical training for our unit medics in a third world environment where hands-on skills were emphasized in areas such as emergency medicine, orthopedics, medical and surgical hospital rotations, and dental care. Trauma skills were refreshed by a two-day course utilizing cadavers as training aids.

All medics were required to pass competency in each aspect of the training and thus were credited with two weeks of medial proficiency training (MPT) and for non-trauma medicine (NTM) by the USASOC Surgeon.

The 19th SFG(A) medical training program in Nepal had its genesis in the late 1990s when the Group's medical section was looking for ways to train 18Ds better for the challenges of delivering medical care in austere, third world conditions. Army continuing education programs run at that time for 18Ds emphasized such things as recertification of National Registry of Emergency Medical Technicians (NREMT) boards but there was a relative lack of exposure to providing those medical skills in a non first world medical environment. Over the past four years, our Group has successfully run four of these OCONUS training missions and we now feel that our program can serve as a model for other SOF units trying to provide similar, hands on training for their medics.

To set up such a program for overseas 18D medical training is not as easy as it would seem, with major issues regarding funding and the proper allocation of resources. This article can hopefully help.

BACKGROUND

Our program for 18D medical sustainment training consists of two weeks (14-16 hours per day) at an OCONUS location where the 18Ds rotate daily between multiple hospital department locations and are supervised by senior Army doctors at a ratio of one doctor per two or three 18Ds. The hospital departments selected are ones suggested by 19th Group 18Ds re-turning from OCONUS locations like Iraq and Afghanistan. These returning medics felt that more exposure to third world medical conditions prior to deployment would have prepared them better for what they encountered overseas.

The goal of training 18Ds to be better medics with more relevant training while engaged overseas in GWOT is laudable, but the pitfalls for setting up such a program are many. After four successful iter-

ations of our particular program, we believe the following lessons learned can help other units to set up more quickly and successfully run a similar program.

The two biggest hurdles in proposing a new program in a large organization like the Army is funding and relevancy. As anyone who has dealt with funding SOF missions knows, there is an alphabet soup of different pots of money available that have many very specific restrictions on their use. For our missions, we used JCET funds as our source, but only after tailoring our training to meet the program's unique requirements. We solved the relevancy issue by obtaining the USASOC Surgeon's approval for the 18Ds to receive both NTM and MPT credit for their time overseas.

1-Funding

The funding source for our program is JCET. These funds derive from a Congressional directive in 1991 (10 USC #2011), which authorized USSOCOM to undertake overseas training missions for SOF units. Through various permutations of the act, the current guidelines are:

- Primary purpose of the JCET Program is to improve SOF readiness by accomplishing SOF mission essential task list/joint mission essential task list (METL/JMETL) training.
- Any benefit to the host nation or its forces is incidental to the purpose of the training.
- Support USSOCOM engagement policy to support GWOT and to contribute to regional stability

Keep in mind, this is NOT A MEDCAP. Our training is to provide required training for 18Ds to make them better deployable overseas. MEDCAPs cannot be funded by JCET funds; that money must come from another source. The goal is not to see thousands of local patients but to train 18Ds in specific, perishable medical skills. This emphasis is enforced by sending the 18Ds to only particular hospital medical departments that we have determined beforehand will provide the best training.

2-Relevancy

When this program was first proposed in 2000, our S-3 came up to me and said “Looks great on paper but which box do I get to check off,” which quickly drove home the point that no matter how good a program is, if it doesn’t fulfill a mission requirement for the organization, it will be tossed aside. Fortunately, for our first two missions to Mongolia in 2001 and 2002, we obtained permission to award NTM credit (a biannual requirement for 18D recertification) to the 18Ds for the deployments. Our program relevance was solidified when the USASOC Surgeon reviewed our Nepal training program in 2003 and 2004 and permitted both MPT and NTM credit to be given. The gaining of MPT credit (18Ds need four weeks every four years) was very important since deploying 18Ds would be accomplishing two objectives with one mission - performing a Group required JCET while simultaneously performing two weeks of required medical continuing education. To gain this credit, we had to demonstrate to the USASOC Surgeon that even though MPT was being done overseas (a waiverable requirement is that MPT should be done CONUS) it was equivalent to U.S. training since the 18Ds were being

closely supervised by senior Army doctors (ratio of one doctor to every two to three 18Ds).

THE MISSION

The medical mission component of the 2004 JCET had two training objectives: the first was to organize and run a two-week 18D medical sustainment education program with an emphasis on trauma medicine and surgical procedures; and the second, to interact and train Royal Nepal Army medical personnel by giving a four-day Combat Lifesaver Course and two two-day Ranger First Responder courses. The medical component was staged at locations in and around Kathmandu, the capital of Nepal. The composite unit consisted of nine 18Ds, three ER physicians, and one dentist. All manning was from the 19th Group, except for two ER physicians attached from the 20th Group.

Objective 1: Medical Training

The 18D training program utilized the facilities of Nepal’s two largest government supported hospitals. The distinction is important since training for the 18Ds can only occur in host nation owned medical facilities. The Royal Nepal Army (RNA) training program was located on the grounds of the largest RNA medical facility in Nepal.

All of the live medical training occurred at the larger hospital since it provided the widest and most interesting range of patients, and more importantly, allowed the greatest latitude in the training of the 18Ds. Even though the physical plant was rather old and run down, the medical care by the physicians was very impressive. The 900-bed hospital is one of the few hospitals in Southwest Asia credentialed by the UK Medical Council and as a result, the 18Ds were accompanied on daily rounds by residents and interns from around Asia and even Europe.

Since our goal was to gain MPT credit for the 18Ds, we quantified the minimum number of procedures that they needed to accomplish in each rotation to get full credit. The various department rotation results are listed below with minimum pass rates for the 18Ds;

—Inpatient Departments (ER, Medical, and Surgical): Rotations were at least two days each in each department. 18Ds joined Grand Rounds each day and selected two complicated medical or surgical inpatient cases to follow. On the last day they all wrote up and presented a treatment summary to the other 18Ds and doctors of one of the cases they were following. The medics would scrub in on at least one inpatient surgery.

—Outpatient Day Surgery: 18Ds performed at least three day surgeries, such as lipoma removals and I & Ds, all done under local anesthesia.

—Inpatient Orthopedic Department: One of our best rotations because of the hands-on skills it provided. All closed reduction cases encountered at the hospital that day (up to two dozen) were assembled in the late afternoon at the Outpatient Department and treatment would continue well into the evening. Anesthesia was done by Ketamine induction. The 18Ds were able to do at least two to four cases each, with a heavy preponderance of pediatric cases.

—Dental - Oral and Maxillofacial Surgery Clinic: 18Ds were able to do at least 60 complex extractions each. They also observed treatment of two major facial infections and saw other types of dental trauma treated, such as LeFort and mandibular fractures.

—Cadaver Lab P.O.I.: Located at the hospital's Forensics and Autopsy Lab, this clinic was by far the highlight of our 18D training program. Our ER doctors were able to set up an intense, two day training program utilizing these medical school cadaver facilities. In addition, each of our medics was also able to participate in a least two complete autopsies, an incredible anatomy refresher course for them.

The advantage of this cadaver training cannot be overemphasized. The 18Ds felt this segment of the program was the best hands-on refresher course they had ever taken. Special thanks to the doctors who set up this program over our two missions to Nepal: COL Mike Mouri and MAJ Guillermo Pierluisi; past and present 20th Group Surgeons, MAJ Chris Mandry, 2/20th Group and CPT Peter Chambers, 19th Group Surgeon. Because of shortage of doctors on the side of the 19th Group, the 20th Group agreed to lend several for the JCET missions.

Objective 2: Royal Nepal Army (RNA) Training

An additional goal of the 2004 mission was to support the Commander's regional engagement policy. Therefore, four days were set aside at the end of the exercise to provide medical training to RNA personnel. This segment of our training can also be justified as providing our 18Ds additional experience in their traditional Foreign Internal Defense (FID) mission.

Two training programs were run simultaneously at opposite ends of the hospital complex. The need and urgency for the training was underscored by the several MEDEVACs which came into the hospital throughout the day while the training was going on.

Complex scalp suturing



18Ds following patients on daily medical rounds



Evening lecture series given to 18Ds by doctors



ER scene at one of the hospitals

Gas gangrene case, seen in hospital ER



18Ds performing in hospitals Oral Surgery Clinic



18D performing lipoma removal in hospital's Outpatient Surgery Dept. Lipomas removed are on table.

1. Combat Lifesaver course - a modified, four day Combat Lifesaver Course was run over four days for 50 army medical personnel. Attendees included PAs, medics, and medical NCOs. The interest and desire in the training was brought home when several medics arrived late for the first day and before we could admonish them for tardiness, they explained they had been walking for three days from one of the most remote regions of the country to get there.

List of Topics covered:

Anatomy Review

Combat Care (care under fire)

Airway/Breathing/Circulation

Cervical Spine Immobilization

Assessment of Patient

-Primary

-Secondary

Checklist of Assessment

Hypovolemic Shock

Intravenous Therapy

Blast Injuries

Transport of Patients

-Litters

-Carries

Triage/Casualty Movement with Helo and Ambulance

Field Training Exercise (4th Day): This was a great success with teams competing at various events to a large audience of U.S. and RNA personnel.

2. Ranger First Responder Course: This consisted of two, two-day courses based on the U.S. Ranger First Responder Course. Sixty RNA Rangers were rotated through each course for a final total of 120.

List of Topics covered:

Combat Care (care under fire)

Airway/Breathing/Circulation

Bleeding and Splinting

Checklist of Assessment

Transportation of Patient

-Litters

-Carries

Field Training Exercise at end of second day:

The relevance of this training was brought home when a letter from the U.S. Ambassador was later sent to higher command thanking us for the training and explaining that within three weeks of this training, the RNA felt a minimum of 12 wounded were saved as a direct result of our training efforts.

SUMMARY

We feel this program can serve as a future model for SOF medic continuing education. The gen-

eral concepts can be used by other units to set up their own programs. Our experiences in Nepal were great, but with the worsening political situation as of mid 2005 it may be more difficult or impossible to return in the near future. This program can be moved elsewhere but the below check list should be used to evaluate if a new location will yield the same training advantages as Nepal.

1. Country Requirements for SOF Medic Training Program:

- Wide variety of medical and surgical cases available.

- Relatively advanced hospital facilities available; i.e., an intact hospital system where follow-up care is available for treated patients.

- An Initial Planning Conference (IPC) will be needed to fully evaluate which are the best medical teaching opportunities in the targeted country. In Mongolia, where our first two missions were run, dental, vet PM and ob-gyn were the best opportunities, and in Nepal, medical surgical and cadaver training were the best training options.

Typical external fixation device used in in-patient orthopedic department



Typical pediatric closed reduction case treated in outpatient orthopedic department



Cast placement at Orthopedic Outpatient Department

2. Program Guidelines

- Short time frame (two weeks) - With all the competing elements for our 18Ds time, including deployments, keeping our program short is an absolute requirement.

- High quality instruction - All the physicians and dentists had 15-25 years experience in their field, including extensive teaching time.

- Low ratio of instructors/18Ds - We kept the ratio down to one doctor to every two or three medics to maximize their learning experience.

- Intense - The typical training day typically lasted 14 to 16 hours. Since we only saw pre-screened patients in the clinics we were most interested in, the medics' training time was put to its most efficient use.

- Inexpensive - Our costs are limited to only the actual patients we treated.

- Multi-tasking - It's always easier to promote a new program if it can accomplish several goals at once. Our program helps the Group meet its JCET requirements while also gaining MPT and NTM credit for the 18Ds.

CONCLUSION

This prototype for SOF Medic training has the larger goal of supporting our warfighting efforts. By better preparing 18Ds to use their medical skills in third world environments, they can better interact with the local population they are servicing. AARs and debriefs with 19th SFG(A) personnel returning from Afghanistan over the past three years, stated that running local medical clinics (guerilla hospitals), staffed by 18Ds, was the absolutely best way

for the ODA teams to build a rapport and trust with the local population. We hope that in a small way this program can aid in that effort.



18Ds providing Combat Lifesaver training to RNA soldiers. RNA soldier being splinted.

LTC Harrington has served as the Dental and PM officer for 19th SFG(A) from 1995 to the present. From 1993 to 1995, he served with the 11th SFG(A) as their ESO Officer. He received a DMD from Tufts School of Dental Medicine and his MPH from Harvard School of Public Health. He currently serves as the Secretary for SOMA and has a private dental practice in Weston, Mass.



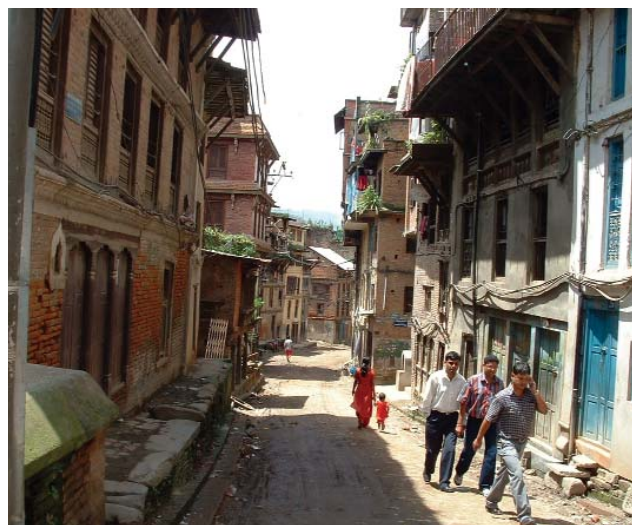
18Ds providing Combat Lifesaver training to RNA soldiers.

Special thanks to past and present 19th Group Commanders, COLs Walker and Burton, and to LTCs Custer and Seagrish, COL Ludlow, and CSM McCabe for all their support over the last four years in helping us to fully develop this training program for our 18Ds.

Bob Harrington



RNA Soldiers practicing 4 man litter carry



Street scene Kathmandu, Nepal



The USSOCOM Surgeon's Office does not endorse any of the below listed private contractors who provide medical training nor does the USSOCOM Surgeon's Office vouch for the competence of the instructors providing the training. This listing of education opportunities is simply to help our readers in the event some would like to further their continuing medical education.

Tactical Element Courses

For additional information on the following courses offered by Tactical Element, please visit online at www.tacticalelement.cc. Course announcements and course registration forms may be obtained by e-mailing info@tacticalelement.cc.

2006 TRAINING COURSES, DATES, AND LOCATIONS

Tactical Emergency Medical Operator

08-13 MAY 06

**North Carolina Justice Academy - East Campus
Salemberg, North Carolina**

Tactical Emergency Medical Operator (TEMO) is a five day program of instruction preparing law enforcement officers, security specialist, fire fighters, and emergency medical services personnel assigned to and/or supporting law enforcement and/or military special operations in a multitude of urban, rural, austere, and remote environments. TEMO targets operators and support personnel of tactical operations or special operations teams, delivered in 48 hours of day and night operations comprised of classroom lecture and practicum, followed by field training exercises. TEMO continues forward regardless the weather. How you train is how you perform!

Course topics include but are not limited to:

- Advanced Airway Techniques
- Anti-Personnel Devices (including Improvised Explosive Devices)
- Aspects of Wound Ballistics
- Tactical Operations (TACOPS)
- Command and Control (C2)
- Tactical Operations
- Urban Combat Skills
- Rural Combat Skills
- Medical Force Protection
- Role and Responsibilities of the Tactical Emergency Medical Operator
- Load-out and Equipment Considerations
- Mission Development
- Pre-Mission Medical Threat Assessment
- Remote Assessment / Remote Mentoring
- Tactical Combat Casualty Care

S.E.R.T. Group International
Specialized Emergency Response Team

Scott Sheldon - President
P.O. Box 371231
Reseda, CA 91337-1231
Ph: 866/500-5465

SPECIAL OPERATIONS MEDICAL COURSES

Tactical Operations Medical Specialist

This high-speed, low-drag course covers the skills necessary to provide emergency medical care in the austere environment. Consisting of classroom, skills stations, and very realistic scenarios this course will provide a new tactical medical operator with the training necessary to support a SPECOPS team during operations and training. Course length is five days.

Curriculum Includes:

- Tactical Combat Casualty Care
- Role/Responsibility of TEMS Provider
- Medical Threat Assessment
- Ballistics
- Team Health
- Buddy Care
- Clan Labs
- Dental Care
- Pediatric Trauma
- Entry/Room Clearing Techniques
- Rescue Techniques
- Field Training Exercise

Special Operations Medical Provider

The course covers basic elements of providing operational emergency medical care in the austere environment. This offers the medical operator options for treating casualties in the tactical or combat environments. Course length is three days.

Curriculum Includes:

- Tactical Combat Casualty Care
- Medical Threat Assessment
- Ballistics
- Team Health
- Buddy Care
- Rescue Techniques

Pediatric Trauma in Tactical Operations

***Prerequisite:* Assignment or intent to provide medical care in tactical operations.**

This course addresses the unique medical needs of the pediatric trauma victim. As noted in Operation Iraqi Freedom, kids pose a unique challenge to medical providers. Following the axiom that “kids are not small adults,” this course will present assessment and treatment options for those children injured during tactical or combat operations.

Curriculum Includes:

- Kids and Combat Operations - A Primer
- The PALS Paradigm
- Patterns of Injury
- Treatment Options
- Skills
- Real World Scenarios

The following is a list of information resources for continuing education.

Casualty Care Research Center
Department of Military and Emergency Medicine
Uniformed Services University
4301 Jones Bridge Road
Bethesda, Maryland, United States 20814-4799
Office: (301) 295-6263
Fax: (301) 295-6718
Web Site: www.casualtycareresearchcenter.org

CERTAC
P.O. Box 354
Drake, Colorado, United States 80515
Office: (970) 214-9355
Fax: None
Web Site: www.certac.com

Counter Force Training
3160 School Drive
Savanna, Illinois, United States 61074
Office: (888) 660-3442
Fax: (815) 273-3247
Web Site: www.counterforcetraining.org

Cypress Creek Advanced Tactical Team
c/o Cypress Creek EMS
16650 Sugar Pine Lane
Houston, Texas, United States 77090
Office: (281) 440-9650 Extension 156
Fax: (281) 440-7677
Web Site: www.ccatt.org

Direct Action Resource Center
6302 Valentine Road
North Little Rock, Arkansas, United States 72117
Office: (501) 955-0007
Fax: (501) 955-0080
Web Site: <http://www.darc1.com>

Gunsite Academy, Inc.
2900 West Gunsite Road
Paulden, Arizona, United States 86334
Office: (928) 636-4565
Fax: (928) 636-1236
Web Site: <http://www.gunsite.com>

Heckler & Koch, Inc.
International Training Division
21480 Pacific Boulevard
Sterling, Virginia, United States 20166-8903
Office: (703) 450-1900 Extension 293
Fax: (703) 406-2361
Web Site: <http://www.tacticalmedicine.com/>

HSS International, Inc.
P.O. Box 50 / # 337
Lake Arrowhead, California, United States 92352
Office: (909) 336-4450
Fax: (714) 242-1312
Web Site: <http://www.hssinternational.com>

Insights Training Center
P.O. Box 3585
Bellevue, Washington, United States 98009
Office: (425) 827-2552
Fax: (425) 827-2552
Web Site: <http://www.insightstraining.com>

Lion Claw Tactical
5900 East Virginia Beach Boulevard
Suite 408
Norfolk, Virginia, United States 23502
Office: (757) 321-2059
Fax: (757) 498-0059
Web Site: www.lionclawtactical.com

“Medic Up” Tactical Medic Training Course
3300 Via Giovanni
Corona, California, United States 92881
Office: (909) 340-9201
Fax: (909) 340-9201
Web Site: www.medicup.com

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SOF and SOF Medicine Book List

Colonel Rocky Farr

Those of you who know my history of joining the Army at age 18 may realize that I have evidently conned the Army into sending me off for long term civilian schooling for my bachelor's degree, two master's degrees, and my doctor of medicine. Each time, I bought books. So below is my book list of military medical history and Special Operations Forces history books currently in my library. For a detailed list with the publishers and date of publication, please contact the JSOM at JSOM@socom.mil.

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15 Months In SOG: A Warrior's Tour	Thomas L. Nicholson & T. P. Nichols	0804118728
90 Minutes at Entebbe	William Stevenson & Uri Dan	0553104829
200 Years of Military Medicine	Rose C. Engelman	GPO, 1975
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A Concise History of the U.S. Army Airborne Infantry	Geoffrey T. Barker	0922004021
A Concise History of U.S. Army Airborne Infantry	Geoffrey T. Barker	0922004013
A Concise History of U.S. Army Special Operations Forces	Geoffrey T. Barker	1988
A Confederate Nurse: The Diary of Ada W. Bacot	Ada W. Bacot & Jean V. Berlin	0872499707
A Confederate Surgeon's View of Ft. Donaldson: The Diary of John Kennerly Farris	Jim Stanbery	Regimental Studies, 1991
A Historical Perspective of Special Operations Forces as Instruments of Strategy	Gregg D. Jones	CGSC 1991
A History of Medicine in South Carolina: 1825-1900	Joseph I. Waring & Richard H. Shryock	SCMA
A History of Military Medicine	Richard A. Gabriel & Karen S. Metz	031327746X
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A Study of the Medical Support to the Union & Confederate Armies During the Battle of Chickamauga: Lessons & Implications for Today's U.S. Army Medical Department Leaders	David A. Rubenstein	CGSC, 1990
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A Systematic Review of "Commando" (Special) Operations 1939-1980	Edward Lutwak, Steven L. Canby, & David L. Thomas	
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Prairie Fire	Kent White	0938936077
Project Omega: Eye of the Beasts	James E. Acre	1555715117
Psychological Operations: Principles and Case Studies	Frank L. Goldstein & Benjamin F. Findley	9996617491
Queen Victoria's Gene	D. M. & W. T. W. Potts	0750908688
Rats, Lice, & History: Being a Study in Biography, Which, After Twelve Preliminary Chapters Indispensable for the Preparation of the Lay Reader, Deals With the Life History of Typhus Fever	Hans Zinsser	0333395670
Red Berets and Red Crosses	Cherry Naill	908047181X
Reflections of a Warrior	Frank D. "Jim" Miller, E. C. Kureth & Paul McCarthy	0671753967
Regimental Losses in the American Civil War 1861-1865: A Treatise on the Extent and Nature of the Mortuary Losses in the Union Regiments, With Full and Exhaustive Statistics Compiled from the Official Records on File in the State Military Bureaus and in Washington	William F. Fox	0890290075
Reminiscences of the Cuban Revolutionary War	Che Guevara	0237716321

TITLE	AUTHOR	ISBN
Repairing the March of Mars: The Civil War Diaries of John Samuel Apperson, Hospital Steward in the Stonewall Brigade, 1861-1865	John H. Roper, Jason Clayman, & Peter Gretz	0865547793
Resting Rebels: A Medical History of the San Antonio Confederate Cemetery	Warner D. Farr	Private, 1990
Rorke's Drift 1879: Pinned Like Rats in a Hole	Ian Knight, Michael & Alan Perry	1855329514
Sabotage and Subversion: The SOE and OSS at War	Ian Dear	0304352020
Saddle Bag and Spinning Wheel: Being the Civil War letters of George W. Peddy, M.D., Surgeon, 56th Georgia Volunteer Regiment, C.S.A. and his Wife Kate Featherston Peddy	George W. & Zerlina C. Peddy	0865540047
Sage	Jerry Sage	0440075807
Science and Medicine in the Old South	Ronald L. Numbers & Todd L. Savitt	0807114642
Secret Armies: Inside the American Soviet and European Special Forces	James Adams	0871132230
Secret Army, Secret War: Washington's Tragic Spy Operation in North Vietnam	Sedgwick D. Tourison	1557508186
Secret Commandos	John L. Plaster	0684856735
Secret Missions of the Civil War	Philip Van Doren Stern	0517000024
Secret Soldier: The True Life Story of Israel's Greatest Commando	Moshe (Muki) Betser & Robert Rosenberg	0871136376
Secret Soldiers: Special Forces in the War Against Terrorism	Peter Harclerode & Mike Dewar	0304355070
Secret War in North Vietnam	Dale Andrade & Kenneth J. Conboy	0700610022
Secret Warriors: Inside the Covert Military Operations of the Reagan Era	Steven Emerson	0399133607
Semi-regular and Irregular Warfare in the Civil War	Ethelbert Courtland Barksdale	
Shadow of the Sentinel: One Man's Quest to Find the Hidden Treasure of the Confederacy	Warren Getler & Bob Brewer	0743219686
Shadow Warriors: Inside the Special Forces	Tom Clancy, Carl Stiner, & Tony Koltz	0399147837
Shadows of Glory	Owen Parry	0380820870
Sideshow	William Shawcross	0671230700
Simon Baruch: Rebel in the Ranks of Medicine, 1840-1921	Patricia Spain Ward	0817305890
Snake Eater	Don Bendell	0440211417
SOG	John L. Plaster	1581600585
SOG, MACV Studies and Observations Group: Behind Enemy Lines, 4 volumes	Saal Harve	0962597031
SOG: The Secret Wars of America's Commandos in Vietnam	John L. Plaster	0684811057
Soldier Under Three Flags: Exploits of Special Forces' Captain Larry A. Thorne	H. A. Gill & Larry A. Thorne	0934793654
Soldiers on Skis	Flint Whitlock & Bob Bishop	0873646762
Soldiers, Spies, and the Rat Line: America's Undeclared War Against the Soviets	James V. Milano & Patrick Brogan	1574880500
Source Book of Medical History	Logan Clendening	0486206211
Spec Ops: Case Studies in Special Operations Warfare	William H. McRaven	891415440
Special Forces: A Guided Tour of U.S. Army Special Forces	Tom Clancy & John Gresham	0425172686
Special Forces: The Changing Face of Warfare	Mark Lloyd	1854091700
Special Forces in the Invasion of France, Histoire & Collections	Paul Gaujac	2908182947
Special Forces of the United States Army 1952-82	Ian Sutherland	0912138432
Special Operations Forces: An Assessment	John M. Collins	0160431913
Special Operations Forces and Elusive Enemy Ground Targets: Lessons from Vietnam and the Persian Gulf War	William Rosenau	083303071X
Special Operations in the American Civil War	Anthony M. Raper	CGSC, 1996
Special Operations in United States Strategy	U.S. Government (GPO)	0160016126
Spetsnaz: The Inside Story of the Soviet Special Forces	Viktor Suvorov	0393026140

TITLE	AUTHOR	ISBN
Spies and Commandos: How America Lost the War in the Shadows: The Guerrilla in History	Robert B. Asprey	0688128157
Spies and Spymasters of the Civil War	Donald E. Markle	078180227X
Spies for the Blue and Gray	Harnett T. Kane	0385014643
Spies!: Women in the Civil War	Penny Colman	1558702679
Spy of the Rebellion: Being a True History of the Spy System of the United States Army During the Late Rebellion, Revealing Many Secrets of the War	Allan Pinkerton	0803287224
Stonewall Jackson's Surgeon Hunter Holmes McGuire: A Biography	Maurice F. Shaw	1561900478
Subnational Conflict in the Mediterranean Region	Brian M. Jenkins & MĀdhava Ghimire	9993340715
Sun Pin: The Art of Warfare	Sun Pin, D. C. Lau, & Roger T. Ames	0345379918
Sun Tzu	J. H. Huang & Sun Tzu	0688124003
Sun Tzu's Art of War: The Modern Chinese Interpretation	Tao Hanshang & Yuan Shibing	0806927895
Sun-Tzu: The Art of War	Roger T. Ames & Sun Tzu	034536239X
Sunzi Speaks	Tsai Chih Chung & Brian Bruya	0385472587
Swords of Lightning: Special Forces and the Changing Face of Warfare	Terry White	0080409768
Tabulating Equipment and Army Medical Statistics	Albert G. Love , Eugene L. Hamilton, & Ida Levin-Hellman	B0007DX0NY
Tailwind: A True Story	Robert Van Buskirk	0849903416
Tarnished Scalpels: The Court-Martials of Fifty Union Surgeons	Thomas P. Lowry & Jack D. Welsh	0811716031
Team Sergeant	William T. Craig	0804117144
Terror Out of Zion: Irgun Zvai Leumi, Lehi and the Palestine Underground, 1929-1949	J. Bowyer Bell	0380393964
The Air Force Role in Low-Intensity Conflict	David J. Dean	B0006EL93C
The Art of Rulership: A Study of Ancient Chinese Political Thought	Roger T. Ames & Huai-Nan	0791420620
The Art of Spiritual Warfare	Grant R. Schnarr & Robin Moore	0835607879
The Art of War	Sun Tzu	1570629781
The Art of War	Sun Tzu & John Minford	0670031569
The Art of War	Sun Tzu & James Clavell	0385299850
The Art of Strategy: A New Translation of Sun Tzu's Classic The Art of War	R.L. Wing & Sun Tzu	0385237847
The Art of War: In Sun Tzu's Own Words	Sun Tzu & Gary Gagliardi	1929194005
The Bay of Pigs: The Leaders' Story of Brigade 2506	Haynes Bonner Johnson	0393042634
The Black Devil Brigade: The True Story of the First Special Service Force in World War II	Joseph A. Springer	0935553509
The Black Scalpel	Geoffrey Parker	0718300815
The Cape Town Highlanders, 1885-1970	Neil D. Orpen	B0006CRUVY
The CIA's Secret War in Tibet	Kenneth J. Conboy & James Morrison	0700611592
The Civil War Letters of Dr. Harvey Black: A Surgeon with Stonewall Jackson (Army of Northern Virginia)	Harvey Black, Glenn L. McMullen & Mary Kent-Black	0935523456
The Company They Keep	Anna J. Simons & Carla Bolte	0684828162
The Confederate Cause and Conduct in the War Between the States	Hunter H. McGuire & George L. Christian	0964149109
The Country Team	Robin Moore	B0006BOOEQ
The Dahlgren Affair: Terror and Conspiracy in the Civil War	Duane P. Schultz	0393046621
The Devil's Brigade	Robert H. Adleman & George H. Walton	1591140048
The Eagle's Talons: The American Experience at War	Dennis M. Drew & Dr. Donald M. Snow	1410200698
The Elite: The Story of the Rhodesian Special Air Service	Barbara Cole	0620074213
The Evolution of Preventive Medicine in the United		

TITLE	AUTHOR	ISBN
The Evolution of Preventive Medicine in the United States Army	Stanhope Bayne-Jones	1114667943
The Fall of Eben Emael	James Mrazek	0891416641
The German Northern Theater of Operations, 1940-1945	Earl. F. Ziemke	B0007ETEOM
The Golden Jubilee of the Association of Military Surgeons of the United States, a History of its First Half-Century-1891-1941	Edgar E. Hume	B0007EZYV4
The Great Raid on Cabanatuan	William B. Breuer	0471037427
The Green Berets	Robin Moore	0312984928
The Healers: A History of American Medicine	John Duffy	0252007433
The Healer's Road	J.L. Reasoner	0515117625
The Hunt for Bin Laden	Robin Moore	0375508619
The Illustrated Art of War	Sun Tzu & Thomas Cleary	1570624224
The Imperial War Museum Book of War Behind Enemy Lines	Julian F. Thompson	157488381X
The Intrepid Guerrillas of North Luzon	Bernard Norling	0813121183
The Jungle is Neutral	F. Spencer-Chapman	0583128165
The Killing of Reinhard Heydrich: The SS Butcher of Prague	Callum A. MacDonald	0306808609
The Kinder, Gentler Military	Stephanie Gutmann	0684852918
The Lincoln Conspiracy	David W. Balsiger & Charles E. Sellier	091721403X
The Man Who Tried to Burn New York	Nathan H. Brandt	0425119181
The Medical Support System for the Confederate Army of Tennessee During the Georgia Campaign, May-Sept. 1864	Frank R. Freeman	Tennessee Historical Quarterly, 1993
The Medics' War: United States Army in the Korean War	Albert E. Cowdrey	B0006ELAA4
The One That Got Away	Chris Ryan	1574881566
The Parachute Ward: A Canadian Surgeon's Wartime Adventures in Yugoslavia	Brian J. Street	0886191033
The Partisans, United States Holocaust Memorial Museum	Yitzhak Arad	0896040100
The Protected Will Never Know	Leigh Wade	0804117136
The Roots of Counter-Insurgency: Armies and Guerrilla Warfare	Ian R. Beckett	0713719222
The Secret War Against Hanoi: Kennedy and Johnson's Use of Spies, Saboteurs, and Covert Warriors in North Vietnam	Richard H. Shultz, Jr.	0060194545
The Secret War for the Union: The Untold Story of Military Intelligence in the Civil War	Edwin C. Fishel	0395742811
The Secret War Report of the OSS	Anthony Cave Brown	0425032531
The Seven Military Classics of Ancient China, including The Art of War	Ralph D. & Mei-Chun Lee Sawyer	0813312280
The Silent War: South African Recce Operations 1969 to 1994	Peter Stiff	1919854045
The Six Secret Teachings on the Way of Strategy	Ralph D., Mei-Chun Lee, & Shang Lu Sawyer	1570622477
The Social Transformation of American Medicine	Paul Starr	0465079342
The Southern Soldier's Health Guide	John Stainback Wilson	1877791075
The Soviet Partisan Movement, 1941-1944: A Critical Historiographical Analysis	Leonid D. Grenkevich & David M. Glantz	0714644285
The Story the Soldiers Wouldn't Tell: Sex in the Civil War	Thomas P. Lowry	0811715159
The Story of the Arab Legion	John Bagot Glubb	B0007J7994
The Sword and the Olive: A Critical History of the Israeli Defense Force	Martin L. Van Creveld	1891620053
The Tao of War	Wang Chen, Ralph D. Sawyer & Mei-Chun Lee Sawyer	0813340810
The Tao of Peace	Wang Chen, Ralph D. Sawyer & Mei-Chun Lee Sawyer	1570625115
The Tao of Spycraft: Intelligence Theory and Practice in Traditional China	Ralph D. & Mei-Chun Lee Sawyer	0813333032
The Uncivil War: Irregular Warfare in the Upper South, 1861-1865	Robert R. Mackey	0806136243

TITLE	AUTHOR	ISBN
The Vietnams of the Green Berets	Gordon M. Patric	B0006EKUAA
The War Between the Spies: A History of Espionage During the American Civil War	Alan Axelrod	0871134829
The War for the Cities	Robert Moss	0698104498
The Witch Doctor	Michael Temchin	0896040453
The Wounded River: The Civil War Letters of John Vance Lauderdale, M.D.	John V. Lauderdale & Peter Josyph	0870133284
The Wrong War: Why We Lost in Vietnam	Jeffrey Record	155750699X
Theory and Practice in American Medicine	Gert H. Brieger	0882021583
This Awful Drama: General Edwin Gray Lee, C.S.A. and His Family	Alexandra L. Levin	0533072425
Trends in Outside Support for Insurgent Movements	D. L. Byman, P. Chalk, B. Hoffman, W. Rosenau, & D. Brannan	0833030523
True Americanism: Green Berets and War Resisters	David M. Mantell	0807724297
Twilight Warriors: Inside the World's Special Forces	Martin C. Arostegui	0312152345
Ukrainian Resistance Movement	UPA Medical Services	0920092306
Unconventional Warfare: Rebuilding U.S. Special Operations Forces	Susan L. Marquis	0815754752
Uneasy Warriors: Coming Back Home	Vincent Coppola	1563521970
United States Army in World War II: Special Studies Military Relations Between the United States and Canada 1939-1945	Stanley W. Dziuban	0160018714
United States Army Logistics, 1775-1992: An Anthology	Charles R. Shrader & John W. Mountcastle	0898755301
U.S. Army Special Forces, 1961-1971	Francis J. Kelly	B0006C7SMK
U.S. Army Counterinsurgency and Contingency Operations Doctrine, 1860-1941	Andrew J. Birtle	0788173278
U.S. Army Heraldic Crests: A Complete Illustrated History of Authorized Distinctive Unit Insignia	Barry J. Stein & P.J. Capelotti	0872499634
U.S. Army Special Operations In World War II	David W. Hogan	141021690X
U.S. Army Special Warfare: Its Origins	Alfred H. Paddock Jr.	0700611770
U.S. Special Operations Forces in Action: The Challenge of Unconventional Warfare	Thomas K. Adams	0714643505
USA Airborne 50th Anniversary Commemorative Edition	Bart Hagerman	0938021907
War in Cambodia 1970-75	Kenneth Conboy & Kenneth R. Bowra	85045851X
War in the Shadows, Volumes 1 & 2	Robert B. Asprey	0385034709
Warrior Politics: Why Leadership Demands a Pagan Ethos	Robert D. Kaplan	0375505636
Weapon of choice	Charles H. Briscoe, Richard L. Kiper, James A. Schroder, & Kalov I. Sepp	ACGSC 2003
When Sherman Marched North from the Sea: Resistance on the Confederate Home Front	Jacqueline Glass-Campbell	0807828092
White Dragon Two	Khambang Sibounheuang	1885354142
White Roses: Women Nurses in the Civil War	Rebecca D. Larson	1577470117
White Tigers: My Secret War in North Korea	Ben S. Malcom & Ron Martz	1574881981
Who's Who from MACV-SOG	Steve Sherman	1996
With Courage and Delicacy: Civil War on the Peninsula: Women and the U.S. Sanitary Commission	Nancy Scripture-Garrison	1882810392
Women at the Front: Hospital Workers in Civil War America	Jane E. Schultz	080782867X
Yellow Fever and the South	Margaret Humphreys	0813518202
Yoni Netanyahu: Commando at Entebbe	Devra Newberger-Speregen	0827606427
You're No Good to Me Dead: Behind Japanese Lines in the Philippines	Robert Stahl	1557507937

The following is a compiled list of SOF related books recommended for your reading by those who were there. This list is complements of Len Blessing. If anyone has other books they would like to add to the list, let us know. The intent is to present a concise list of the vast array of reading material available that pertains to the mission of Special Operations - both past and present.

Every attempt is made to maintain the list's integrity with respected and legitimate works. I have removed the books that duplicated COL Farr's list.

Readers who feel a selection does not merit inclusion are encouraged to contact us with disputes. We also strongly encourage readers to write a short review for the books they have read and/or have personal first hand knowledge concerning a specific selection. This will help maintain a high degree of content validity.

TITLE	AUTHOR
00:19:57	Dave F Stafford
A Tear For Somalia (Written by a Brit who married a Somali woman while serving as a member of the British Camel Corps after the end of WWII. Not a history, but it does give insight into Somali society.)	Douglas T Collins
A Very Short War (About the last gunfight and the last sacrifices of the Vietnam-era war in the recovery of the crew and ship SS Mayaguez in 1975.)	John F Guilmartin Jr
Advice and Support: The Early Years	Ronald H Spector
Airborne and "Special Forces" (non-fiction, good quick references, especially for family or civilians)	Hans Halberstadt
American Guerrilla (WW II U.S. led guerrillas in Phillipines)	Unknown
Band of Brothers (A great story about "E" Company, 506th PIR, 101st ABN Division in WWII.)	Stephen Ambrose
Battle for the Central Highlands: A Special Forces Story	George E Dooley
Beyond Nam Dong	Roger Donlon
Black Eagles (Fiction)	Larry Collins
Blackburns Headhunters (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	COL Donald Blackburn
Blackjack -33: With Special Forces in the Viet Cong Forbidden Zone	James C Donahue
Blackjack -34 (Previously titled "No Greater Love")	James C Donahue
Break Contact Continue Mission (Fiction)	Raymond D Harris
Bunard: Diary of a Green Beret	Larry Crile
Che Guevarra on Guerrilla Warfare	Ernesto Gueverra
Covert Warrior	Warner Smith
Danger Close (Non-fiction. SF member charged with murder in a bar fight within 3 days of graduation from the Q Course.)	Mike Yon
Fighting Men: Stories of Soldiering	Jim Morris
Fire Your FPL's	Mike Di Rocco
Five Fingers	Gayle Rivers
Five Years To Freedom	James N Rowe
Flags of our Fathers	James Bradley & Ron Powers
Foreign Devils on the Silk Road (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Greatest Rescue Mission (Ranger operation to free POWs in the Philippines)	
Green Berets at War: U.S. Army Special Forces in Asia 1956-1975	Shelby L Stanton

TITLE	AUTHOR
Green Berets in the Vanguard: Inside Special Forces 1953-1963	Chalmers Archer Jr
Guerrilla Warfare: On Guerrilla Warfare	Mao Tse tung
Hazardous Duty	David H Hackworth (COL) & Tom Mathews
Hell In A Very Small Place (Siege of Dien Bien Phu)	Bernard Fall
Ho Chi Minh: A Life	William J Durker
In The Village of the Man	Loyd Little
Inside Al Qaeda, Global Network of Terror	Rohan Gunaratna
Inside Delta Force: The story of America's elite counterterrorist unit	Eric L Haney
Inside the Green Berets: The First Thirty Years	Charles M Simpson III
It Doesn't Take A Hero	Norman H Schwarzkopf (GEN Ret) & Peter Petre
Laos: War and Revolution	Nina S Adams (Ed)
Like Hidden Fire (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Logistical Support of Special Operations Forces During Operations Desert Shield and Desert Storm	Donald W Betts
Long Shadows (Fiction)	Kent White
Lost Crusader: The Secret Wars of CIA Director William Colby	John Prados
Love and Duty	Ben & Anne Purcell
Medal Of Honor	Roy P Benavidez
Memories Of Maggie: Martha Raye: A Legend Spanning Three Wars	Noonie Fortin
My American Journey	Colin Powell (GEN Ret) & Joseph E Persico
My Secret War	Richard S Drury
Night Jungle Operations	Thomas B Bennett
Night of the Silver Stars: The Battle of Lang Vei	William R Phillips
No Surrender (Japanese soldier who evaded capture and survived 30 years in the Philippines; it's a great book about perseverance and commitment to warrior ideals.)	Hiroo Onoda
Once A Warrior King: Memories of an Officer in Vietnam	David Donovan
O O T W Target Cuba	Robin Moore & JC Lamb
Operation Vulture	John Prados
OSS to Green Berets	Aaron Bank (COL Ret)
Parthian Shot	Loyd Little
Pathfinder: First In, Last Out (A very well written account of Richie Burns' first tour in RVN, during which he provided support to a Mike Force mission, and which describes other activities very similar to SF missions during the war.)	Richard C Burns
Peoples' War, Peoples' Army	Vo Nguyen Giap
Perilous Options: Special Operations as an Instrument of U.S. Foreign Policy	Lucien S Vandenbroucke
Phantom Warriors, Book II	Gary A Linderer
Phantom Warriors: LRRPs, LRP's, and Rangers in Vietnam, Book I	Gary A Linderer
Presidents' Secret Wars: CIA and Pentagon Covert Operations from World War II Through the Persian Gulf	John Prados
Rangers at War: Combat Recon in Vietnam	Shelby L Stanton
Rescue Of River City	Drew Dix
Return of The Enola Gay	Paul W Tibbets
Return With Honor	Scott O'Grady (Capt) & Jeff Coplon

TITLE	AUTHOR
Setting the East Ablaze (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Seven Pillars of Wisdom (Middle East insight)	TE Lawrence
SF Bibliography: Collection of articles and other readings with Special Forces topics	Radix Press/Dan Godbee
Shadow War: Special Operations and Low Intensity Conflict	HT Hayden
Silent Birdmen (281st AHC pilot account; Project Delta Ops in Ashau Valley.)	Al Rampone
Slow Walk In A Sad Rain	John P McAfee
SOG and SOG Photo Book	John Plaster
SOG: Volume I, II, III and IV	Harve Saal
SPEC OPS: Case Studies in Special Operations Warfare: Theory and Practice	William H McRaven
Special Forces 1941-1987	LeRoy Thompson
Special Forces, the U.S. Army's experts in Unconventional Warfare	Caroll B Colby
Special Men and Special Missions: Inside American Special Operations Forces, 1945 to the Present	Joel Nadel & JR Wright
Spies And Commandos	Kenneth Conboy
Stolen Valor	B G Burkett & Glenna Whitley
Strategy and Policy Background Umbrella Concept for Low Intensity Conflict	Alex & Hamilton Booz
Street Without Joy (French in Indochina; Good groundwork for SF in Vietnam)	Bernard B Fall
Taking The High Ground: Military Moments With GOD	Jeff O'Leary (Col)
Talking with Victor Charlie: An Interrogator's Story	Sedgwick D Tourison Jr
Tam Phu	Leigh Wade
The Barking Deer (Fiction)	Jonathan Rubin
The Blood Road: The Ho Chi Minh Trail and the Vietnam War	John Prados
The Chindit War (Good section on Merrill's Marauders)	Shelford Bidwell
The Devil's Guard (A non-SF book; a good read and supposedly historically accurate. Covers the war from the viewpoint of the ex-Nazi's who were in the French Foreign Legion fighting the Viet Minh.)	George R Elford
The Dying Place (Fiction)	David A Maurer
The Great Game (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
The Green Berets in Vietnam, 1961-71	Francis J Kelly
The Hidden History of the Vietnam War	John Prados
The Last Confucian	Denis Warner
The Making of a Quagmire	David Halberstam
The Montagnards of South Vietnam	Robert L Mole
The New Legions	Donald Duncan
The Politics of Heroin in SE Asia (Essential reference for understanding the Golden Triangle.)	Alfred McCoy
The Price of Exit (Helicopter pilot, Lam Son 719 and CCN)	Tom Marshall
The Raid	Benjamin F Schemmer
The Ravens (The classic about our Bird Dog brothers)	Christopher Robbins

TITLE	AUTHOR
The Rescue of Bat-21	Darrel D Whitcomb
The Road to Arnhem: A Screaming Eagle in Holland	Donald R Burgett
The Secret Wars: A Guide to Sources in English, Volume II, Intelligence, Propaganda and Psychological Warfare, Covert Operations, 1945-1980	Myron J Smith
The Sorrow of War: A Novel of North Vietnam (This is a work of fiction with many facts written by a NVA Officer.)	Bao Ninh
Tiger the Lurp Dog (Fiction)	Kenneth Miller
Tragedy in Paradise: A Country Doctor at War in Laos	Charles Weldon, MD
Trespassers on the Roof of the World (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Umbrella Concept for Low Intensity Conflict	Alex & Hamilton Booz
Unconventional Operations Forces of Special Operations	Mark D Boyatt
Uneasy Warrior	Vincent Coppola
U.S. Army Special Forces 1952-84	Gordon L Rottman
U.S. Army Handbook for North Vietnam Dept. of Army: 550-57	
U.S. Army Handbook for Cambodia Dept. of Army: DA Pam: 550-50	
U.S. Army Handbook for Laos Dept. of Army: DA Pam: 550-58	
U.S. Army Handbook for South Vietnam Dept. of Army: DA Pam: 550-55	
U.S. Army Handbook: Minority Groups in the Republic of Vietnam: Ethnographic Series Dept. of Army:DA Pam: 550-105	
U.S. Army Special Operations in World War II	David W Hogan Jr
U.S. Special Forces	Peter McDonald
Urgent Fury: The Battle for Grenada	Mark Adkin
Valley of Decision: The Siege of Khe Sanh	John Prados
Vietnam Above The Tree Tops: A Forward Air Controller Reports	John F Flanagan
Vietnam in American Literature	Philip H Melling
Vietnam Military Lore: Legends, Shadow and Heroes	Ray E Bows (MSG Ret)
Vietnam Order of Battle: A Complete, Illustrated Reference to the U.S. Army and Allied Ground Forces in Vietnam, 1961 - 1973	Shelby Stanton
Vietnam Studies: Command and Control 1950-1969	
Vietnam: A History	Maj Gen George Eckhardt
Vietnam: The Origins of Revolution	Stanley Karnow
Vietnam: The Secret War	John T McAlister Jr
War Stories of the Green Berets: The Vietnam Experience	Kevin M Generous
War Story	Hans Halberstadt
We Were Soldiers Once And Young	Jim Morris
	Harold G Moore (LTG) & Joseph L Galloway

Picture This....

Gabriella Cardoza-Favarato, MD

Daniel Schissel, MD

You are on a humanitarian mission in central Africa when a local freedom fighter asks you to look at a rash on his palms (photo 1). You ask the patient if he has noted any other skin lesions. He states that he noticed a small bump on his penis about 6 weeks ago that has now become a painless sore (photo 2). Using the primary lesion definitions outlined in your SOF medical handbook, how would you describe the morphology of the pictured lesions? What is your differential diagnosis for bilateral, scattered, discrete, brownish-red, nontender palmar macules ranging from 4mm to 6mm in diameter; and single, nontender, shallow genital ulcer with firm indurated border, approximately 5mm in diameter?



Answer:

Morphology lesion I—Macules and firm papules 5mm to 1cm in diameter, round to oval shaped; may also be papulosquamous, pustular, acneform; pink, red, “meaty” or “copper” colored. Scattered discrete lesions, usually a symmetric, generalized eruption. May see localized scaling and papular lesions on head (hairline, nasolabial, scalp), neck, palms, and soles

Morphology lesions II—Chancre: button-like firm papule that develops into painless erosion and then ulcer with raised indurated border and scanty serous exudates; few mm to 1 to 2cm in diameter; round or oval shaped; usually single lesion but may find kissing or multiple lesions; red, “meaty” colored; usually painless; infectious.¹

Differential diagnosis

Photo 1: Drug eruption, pityriasis rosea, viral exanthema, infectious mononucleosis, tinea corporis, tinea versicolor, scabies, “id” reaction, condyloma acuminata, acute guttate psoriasis, lichen planus.

Photo 2: Primary syphilis, chancroid, genital HSV, fixed drug eruption, lymphogranuloma venereum, donovanosis, traumatic ulcer, furuncle, aphthous ulcer.¹

SYPHILIS

Syphilis is a systemic infectious disease caused by the spirochete *Treponema pallidum*; it is transmitted by direct contact with a lesion during the primary or secondary stage, transplacentally, or during delivery of the fetus through an infected birth canal. Sexual transmission of *T. pallidum* occurs only when mucocutaneous syphilitic lesions are present; lesions are uncommon after the first year of infection.³ The spirochete is fragile and dies when removed from the human environment. *T. pallidum* may infect any organ, leading to multiple clinical presentations² and is thus known as the great imitator.¹

The incidence of syphilis decreased markedly with the discovery and use of penicillin in the 1940s, but increased again with the occurrence of human immunodeficiency virus (HIV) infection in the 1980s. From 1990 to 2000, primary and secondary syphilis infection rates in the United States decreased by approximately 89%.⁵ After reaching this all-time low in the year 2000, the U.S. rate has been on the rise, increasing 19% between the years 2000-2003. Primary and secondary syphilis increased by 4.2%, from 2.4 to 2.5 cases per 100,000 U.S. population. This amplification is largely due to the rapidly increasing rates in the homosexual male population for there was a 27.3% decline among women overall.⁶ Europe is also reporting a rapid rise in cases. Active syphilis diagnosis rose 89% in the fourth quarter of 2003 in Belgium. Brussels reported over a 300% rise in active cases during this same time frame.⁷

The infection is characterized by the appearance of a painless ulcer (chancre) at the site of inoculation (Photo 1) and regional lymphadenopathy. Shortly after inoculation, syphilis becomes a systemic infection with characteristic secondary and tertiary stages. Patients who have syphilis may seek treatment for signs and/or symptoms of primary infection (chancre), secondary infection (manifestations that include rash, mucocutaneous lesions, lymphadenopathy), or tertiary infection (cardiac, neurologic, ophthalmic, auditory, soft tissue/bony gummatous lesions). Neurosyphilis can manifest at any time³ as the CNS is invaded early in the infection.⁹

The incubation period for primary syphilis averages approximately 21 days with a range of 10 to 90 days.¹ Dissemination of *T. pallidum* to all organs occurs as the chancre of the primary infection heals. The clinical signs of the secondary stage begin about six weeks (range two weeks to six months) after the chancre appears and last for two to ten weeks. Occasionally, the signs of secondary syphilis develop while the chancre is still present.⁸ The distribution and morphology of the skin and mucosal lesions are varied and may be confused with many other diseases.² HIV infection may alter the course of secondary syphilis.¹

Latent syphilis may follow secondary syphilis, and is that stage in which there are no clinical signs or symptoms of the infection.² This stage may resolve spontaneously, or it may last for the rest of the patient's life.⁹ The diagnosis of latent syphilis is made only after active infection has been ruled out.³

Primary syphilis is diagnosed by dark-field microscopy of a suspected lesion or by serologic testing. To obtain a specimen for dark field microscopy, the lesion is cleansed and then abraded gently, causing serous

exudates to collect in the lesion. The exudate is collected on a glass slide and viewed under a microscope with a dark-field condenser. The characteristic corkscrew appearance of *T. pallidum* is diagnostic. Negative exams on three different days are required before a lesion is considered negative for *T. pallidum*.⁴

Two classes of serologic tests for syphilis (STS) aid in diagnosing syphilis and other related treponemal diseases: screening, nontreponemal tests and specific treponemal tests. The screening, nontreponemal tests use antigens from the heart and lipids to detect antibodies (syphilitic reagin) directed against host tissues, and include the Venereal Disease Research Laboratory (VDRL), the rapid plasma reagin (RPR), and the automated reagin test (ART). All reactive and weakly reactive screening tests should be confirmed by one of the more specific treponemal tests, and the reactive screening tests should be quantitated by serial dilution. Specific treponemal tests detect antitreponemal antibodies and include fluorescent treponemal antibody absorption (FTA-ABS) test, microhemagglutination assay for antibodies to *T. pallidum* (MHA-TP), and *Treponema pallidum* hemagglutination assay (TPHA).⁹

Screening tests are inexpensive, but they lack the specificity of the treponemal tests and sometimes give biologic false-positive results. A biologic false-positive screening test may indicate an autoimmune or collagen-vascular disorder, viral or bacterial infections, pregnancy, or conditions with altered immunoglobulins, to name a few.¹⁰ Screening tests do not become positive until three to six weeks after the initial infection, thus an early negative serologic test for syphilis cannot rule out infection. In patients with undiagnosed genital lesions, the screening test must be nonreactive at six weeks to exclude syphilis. The treponemal tests usually become positive within three to four weeks and remain so for many years despite effective treatment. Quantitative regan titers decline after treatment, usually becoming negative by one year in primary and by two years in secondary syphilis.⁹ Response to treatment is evaluated by following quantitative nontreponemal tests (VDRL or RPR; preferably using the same test and same lab) and noting an appropriate decrease in titers.

Parenteral penicillin G is the preferred drug of treatment of all stages of syphilis, including congenital syphilis. The preparations used (benzathine, aqueous procaine, or aqueous crystalline), the dosage, and the length of treatment depend on the stage and clinical manifestations of disease. Parenteral penicillin G is the only treatment with documented efficacy for neurosyphilis or for syphilis during pregnancy. Patients who report a penicillin allergy should be desensitized and treated with penicillin. Other agents used in the treatment of syphilis include doxycycline, tetracycline, and ceftriaxone, but every effort should be made to document penicillin allergy before choosing an alternative treatment.¹¹ See your most recent guide to antimicrobial therapy for the most up-to-date treatment guidelines.

The Jarisch-Herxheimer reaction is an acute febrile reaction which may occur within the first 24 hours after any treatment for syphilis; it most often occurs among patients who have early syphilis. No proven methods prevent this reaction; antipyretics may help alleviate symptoms.³ Other cutaneous findings associated with syphilis are Condyloma lata -- soft, flat-topped, moist, red to pale pink papules, nodules, or plaques which may become confluent; found at anogenital region, mouth, and other intertriginous surfaces. Mucous membranes (oral, genital) may show mucous patches -- small, asymptomatic, round or oval, slightly elevated, flat-topped macules and papules up to 1cm in diameter covered by hyperkeratotic white to gray membrane; split papules at angles of mouth. All lesions are infectious. Diffuse hair loss as well as patchy "moth-eaten" alopecia of scalp and beard, loss of eyelashes, and loss of lateral third of eyebrow may also be seen.¹

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LTC Daniel Schissel originated "Picture This" for the MED Quiz. He is a 1993 graduate of the Uniformed Service University of the Health Sciences and completed his internship with the family practice department at Fort Bragg in 1994. He then served as the 2/10th Special Forces Group (Airborne) surgeon and followed on as the 10th SFG(A) Group Surgeon. He completed his residency training in dermatology at the Brooke Army Medical Center in 1999. LTC Schissel is presently stationed in Heidelberg, Germany as a staff physician and the European Regional Medical Command Dermatology Consultant. He has authored the dermatology section of the new SOF manual, serves on the USSOCOM Medical Curriculum and Examinations Board, and is the U.S. Army Aviation Dermatology Consultant.

The following article is relevant for our medics down range. Just substitute the BB type of injury for shrapnel/blunt trauma and it could be one of our own.

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BACKGROUND

Paramedics bring a 55-year-old woman to the emergency department after she was shot above the right eye with a BB gun. The patient is alert and awake, but she is irritated and complains of pain with decreased vision in her right eye. She has no other associated injuries.

On physical examination, her right upper eyelid is mildly edematous with a noticeable puncture wound at the BB entrance site marked by a drop of blood. The right eye is visibly proptotic, and the sclera is injected with chemosis. The patient has restricted movement of the affected eye. The pupil is round, 2mm in diameter, and minimally reactive to light. She has no light perception in that eye. The pupil of the unaffected eye is 4mm and briskly constricts to 2mm with light. Repeated bedside testing with a Tonopen shows intraocular pressures (IOPs) of 75 to 80mm Hg in the right eye with a normal IOP of 10mm Hg in the unaffected, left eye. Instillation of fluorescein reveals no corneal damage. Her vital signs are remarkable for an increased heart rate of 102 bpm and a blood pressure of 163/84mm Hg. The remaining physical examination findings are unremarkable.

What emergency condition do the increased IOP and proptosis indicate?



ANSWER

Acute orbital compartment syndrome (AOCS); AOCS is an ophthalmologic emergency. Patients may have AOCS after blunt or penetrating trauma or after recent retrobulbar anesthesia (e.g., for facial surgery) with the formation of a retrobulbar hematoma. The hematoma increases the IOP, compromising blood flow from the ophthalmic artery and leading to compartment syndrome. In addition, the globe itself can be forced anteriorly into the orbital rim. The medial and lateral canthal tendons tether the globe to the orbital rim and prevent the release of pressure, resulting in proptosis and, more importantly, a precipitous rise in IOP. Compression of the optic nerve and the central retinal artery leads to ischemia with vision loss in the affected eye unless the increased pressure is promptly relieved. Permanent ischemic complications may occur with as little as two hours of increased pressure.

The treatment for AOCS is emergency lateral canthotomy and cantholysis. This procedure is not considered standard of care for most primary care physicians, but in the proper setting, it may be appropriate as a vision-saving maneuver (e.g., emergency medicine). The goal of the procedure is to reduce pressure in the globe to permit blood flow in the central retinal artery and the vasculature of the optic nerve. Primary indications for this procedure include decreased visual acuity, proptosis, pale optic disk on funduscopy, afferent papillary defect, or IOP >40mm Hg in the setting of obviously increased retrobulbar pressure. A contraindication is rupture of the globe, which results in a nonround, pointed pupil; decreased turgor of the globe; or a positive Seidel sign (leak of aqueous humor at site of rupture seen with fluorescein staining). Patients without compromised visual acuity or markedly elevated IOP should be closely monitored while an ophthalmologist is consulted on an emergency basis. CT scanning or MRI may help in elucidating the etiology of the compression or establishing the diagnosis.

To reduce IOP, all patients with AOCS should be treated with intravenous mannitol (to promote direct osmosis of fluid), acetazolamide (to decrease production of aqueous humor), topical beta-blockers (to decrease production of aqueous humor), and methylprednisolone (to control inflammation).

To perform lateral canthotomy and cantholysis, lidocaine 1 to 2% with epinephrine should first be injected into the lateral canthus if the patient is conscious. A small hemostat is then used to grasp and crimp the skin of the lateral canthus for at least one minute to not only mark the area for the incision but also facilitate hemostasis. By using scissors, a lateral incision is made in the lateral canthus down to the orbital rim (approximately 1 to 2cm deep). This maneuver partially reduces IOP and allows access to the superior and inferior crus of the lateral canthal tendon. By taking care to avoid puncturing the globe, the inferior crus of the lateral canthal tendon should be released next. If the IOP is <30mm Hg, the procedure should be stopped. If the IOP continues to be >40mm Hg, the superior crus of the lateral canthal ligament should also be released from the orbital rim. After the lateral canthal tendon is released, the IOP should decrease to <30mm Hg.

If the patient is conscious, he or she may report improved visual acuity in the affected eye after the procedure. Complications include hemorrhage, mechanical injury to the globe, and intraocular infection. The patient in this case underwent lateral canthotomy with release of the inferior crus of the lateral canthal ligament. Vision in the affected eye was partially restored.

For more information on AOCS, see the eMedicine articles [Acute Orbital Compartment Syndrome](#) (within the Emergency Medicine specialty), [Fractures, Orbital](#) (within the ENT specialty), and [Orbital Fracture, Apex](#) (within the Ophthalmology specialty).

Dedication



Staff Sergeant Gary R. Harper Jr.



SSG Gary R. Harper Jr., 29, a Special Forces medical sergeant, assigned to the 2nd Battalion, 5th Special Forces Group (Airborne), died 9 Oct 2005 when his reconnaissance mission was attacked by enemy forces near Baghdad, Iraq.

A native of Illinois, Harper entered the Army 20 May 1993 as an artilleryman. He arrived at 5th SFG (A) 8 Feb 2005 and deployed in support of Operation Iraqi Freedom in June 2005.

Harper's first assignment was with 1st Battalion, 14th Field Artillery, located at Fort Sill. He was then assigned to the 38th Field Artillery, located near Uijongbu, Korea, where he served until January 2003. In January 2003, he began the vigorous, intensive two-year training to become a member of the Army's most elite unit – the Green Berets.

In July 2003, during his Special Forces training, Harper was promoted to the rank of staff sergeant. Harper successfully completed the Special Forces Qualification Course in 2004 and was assigned to 2nd Battalion, 5th SFG (A) at Fort Campbell, Ky. in February 2005. Harper deployed in support of Operation Iraqi Freedom in June 2005.

His military awards decorations include the Army Commendation Medal, Army Achievement Medal, Good Conduct Medal, National Defense Service Medal, Korean Defense Service Medal, NCO Professional Development Service Ribbon, Army Service Ribbon, Multinational Force and Observers and Service Medal, the Iraqi Campaign Medal, the Global War on Terrorism Service Medal, the Global War on Terrorism Expeditionary Medal, the Combat Infantryman Badge, Parachute Badge, the Driver and Mechanic Badges and the Special Forces Tab. He was posthumously recommended for the Bronze Star Medal, Purple Heart, and the Meritorious Service Medal.

SSG Harper is survived by his mother and father, of Virden, IL, and his wife, two sons, and a daughter of Clarksville, TN.

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Special Forces Aidman's Pledge

As a Special Forces Aidman of the United States Army, I pledge my honor and my conscience to the service of my country and the art of medicine. I recognize the responsibility which may be placed upon me for the health, and even lives, of others. I confess the limitation of my skill and knowledge in the caring for the sick and injured. I promise to follow the maxim "Primum non nocere" ("First, thou shalt do no harm"), and to seek the assistance of more competent medical authority whenever it is available. These confidences which come to me in my attendance on the sick, I will treat as secret. I recognize my responsibility to impart to others who seek the service of medicine such knowledge of its art and practice as I possess, and I resolve to continue to improve my capability to this purpose. As an American soldier, I have determined ultimately to place above all considerations of self the mission of my team and the cause of my nation.



Pararescue Creed

I was that which others did not want to be. I went where others feared to go, and did what others failed to do. I asked nothing from those who gave nothing, And reluctantly accepted the thought of eternal lonlinessshould I fail. I have seen the face of terror; felt the stinging cold of fear, and enjoyed the sweet taste of a moment's love. I have cried, pained and hoped...but most of all, I have lived times others would say best forgotten. Always I will be able to say, that I was proud of what I was: a PJ Pararescueman to save a life and to It is my duty as a aid the injured. I will perform my assigned duties quickly and efficiently, placing these duties before personal desires and comforts



These things I do,
"That Others May Live."

A Navy Poem

I'm the one called "Doc"...I shall not walk in your foot steps, but I will walk by your side.I shall not walk in your image, I've earned my own title of pride. We've answered the call together, on sea and foreign land. When the cry for help was given, I've been there right at hand. Whether I am on the ocean or in the jungle wearing greens, Giving aid to my fellow man, be it Sailors or Marines. So the next time you see a Corpsman and you think of calling him "squid", think of the job he's doing as those before him did. And if you ever have to go out there and your life is on the block, Look at the one right next to you...



I'm the one called "Doc".

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